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NO. 48

A TRIP THROUGH BRITISH SHIPYARDS.

NEW WRINKLES IN SHIP AND ENGINE BUILDING IN SOME OF THE LEADING YARDS ABROAD—AN ESPECIALLY INTERESTING LETTER FROM MR. WALTER MILLER, M. E.

LONDON, November 12, 1895.

To the Editor of The Marine Record:

Agreeable to my promise I will endeavor to give you a few notes of my progress through some of the prominent ship-building and engineering establishments throughout Great Britain. Fortunately for me I got through the Clyde establishments before the lockout took place of the engineers, an account of which, no doubt, you have seen in the Engineer and other papers before this. It is getting quite serious and is liable to extend to other districts than Belfast and that part of the Clyde in the vicinity of Glasgow, which are the localities affected at the present time. I have been treated with uniform courtesy wherever I have applied for admission, and the majority of the managers are quite free to show everything they have that they think will be of interest. A few of them, however, are very exclusive, and you are requested not to go outside of the route you are being conducted by the attendant, who is usually some young man from the draughting office, detailed to show you around.

I find the same great question concerns the managers here that trouble them in America—that is the question of the cost of the work turned out—and all of them agree that prices are cut so badly that there is no profit left in the business. While some of the establishments are striving all they can to reduce the cost of this output and take every means to cheapen the work, they seem to have as hard a time to secure contracts as the firm that do nothing but the best work. Those who have their work well designed and with whom nothing but the best "goes," complain that the builders who do the cheaper clan of work are taking contracts at such low figures that the margin of profit must be very small; while the other class give as a reason for turning out the cheaper grade of work is that they cannot get prices that will warrant them doing better work. My idea of this matter is that there are two grades of this work required and both cannot be done in the same establishment. It is plain to be seen here that those engineering concerns who have the largest, well arranged plants, equipped with the latest and most improved tools have the most work in hand, and seem to get the best contracts.

I applied for admission at Mr. John I. Thornycroft's place and received a very polite invitation to visit their works, which I was very glad to do, and met Mr. Thornycroft himself, who conducted me through the works, where I saw many things of great interest to me. There was a duplicate set of engines being erected on the floor of the machine shop, only a little larger than those that were fitted in those famous torpedo catchers Daring and Destroyer, that had a guaranteed speed of 27 knots and actually made 29 knots. Those engines I saw are going into a somewhat larger vessel than the Daring class, which is to have a guaranteed speed of 30

knots. The engines, when turning 425 revolutions per minute are expected to indicate 5,500 h. p., which seems incredible when one looks at them. As seen on the floor there is nothing remarkable looking about them, except the angle at which the cylinders are placed. The work looks very ordinary and the engines are not remarkable for extreme lightness; on the contrary they are quite heavy. The hull does not show anything remarkable either in design or workmanship, but is such work as can be done in any shipyard, nothing like one would expect, or what one would see in Herreshoffs' vessels or machinery.

As I stood forward, looking at the stem of the vessel, I noticed how sharp the stem was. Mr. Thornycroft saw me looking at it and he said: "I did not do that to help her speed; we don't go as far as that," and he explained it. The stem is about 1½ inches thick, and driving the boat at such high speed there is a stream of



MR. WALTER MILLER, M. E.

water that runs up the stem to such a height that it bothers the wheelman to see ahead. At the water line the water is driven ahead of the stem about 8 inches, leaving quite a hole in the water, and the water does not touch the sides of the vessel again until it is back from the stem about 30 inches; and the stream comes up from below this depression, as Mr. Thornycroft says, like a stream from a fire engine.

While at Dundee I saw a remarkable set of twin screw engines; in fact Messrs. Gourley Bros. & Co., engineers and shipbuilders, of Dundee, have a number of specialties in the marine engineering line. The twin engines mentioned were being fitted on board a finely modeled hull that is expected to be very fast, and was built for parties in Calcutta. What was new and original, at least to me, was that the engines had no front column. The bed plates extended across the ship and were bolted together at the middle line of the keel. Three turned columns are placed at proper intervals on

the middle line of the bed plate. On top of these turned columns are placed strong girders of cast iron, bolting the cylinders of the port and starboard engines together. The back columns are of cast iron, in the usual form, and have the guide bars bolted to them. The guide bars in this case are of hollow sections, and are engaged by the crosshead shoe, making the backing and go-ahead sides of the same surface. The engines are tied across, top and bottom, with the working gear, including the telegraph in place on one of the middle columns, so that one engineer can handle both engines with ease. It is about as compact and handy a set of twin screw engines as I have ever seen, and I understand it makes a solid job that is free from vibrations.

Quite an advance has been made in the water-tube boilers over here. Mr. Thornycroft is very enthusiastic over the subject, and says that he cannot talk of anything else. The Belleville boilers building by Maudsley Sons & Field have a number of improvements over those we made for the steamers North West and North Land. At a test I saw going on, they were burning 40 pounds of coal per square foot of grate surface without any trouble, and with very little smoke. Mr. Sampson, manager for Maudsley Sons & Field, told me he was quite prepared to guarantee an evaporation of nine pounds of water per pound of coal per hour.

Among other things that I saw at this old famous engineering works were a number of models of engines which had been turned out from these works, all grouped in what they called the "directors' room," and put in operation by shifting a belt. It was quite a sight to see them all working. I will try to write you again before I return if I can get the time. Yours truly,

WALTER MILLER.

THE FERRY LINE APPRECIATED.

The Port Dover, Ont., Maple Leaf has the following about the Shenango ferry line: "Since the Shenango No. 1 began running in August it has brought over, not to speak of any return freight at all, the following: 1,354 cars of coal, 78 cars of iron ore and manufactured iron of all kinds, 2 cars of stone, 3 cars of pumpkins, 2 cars of walnut logs, and one each of lumber and coke.

"The coal weighed 70,408,000 pounds, of which over 51,000,000 was for the G. T. R. R. The iron ore, etc., amounted to 2,960,000 pounds, the stone to 80,000, coke 20,000, walnut 80,000, lumber 40,000. Assuming that Shenango No. 1 brought freight at the same rate for the next nine months that she has during the past three, and there is no reason to suppose that she won't do even better, when everything is in good running order, she would bring in at least 290,000,000 pounds of freight a year, and her consort should do equally well, making a total of freight landed here of about 600,000,000 pounds a year, not to speak of the return freights or the revenue to be derived from passengers, a revenue which as time goes on will undoubtedly grow. The amount of duties collected in October was \$6,673.20."

The Shenango No. 2 will probably be in service by December 1.

A NEW shipyard is to be built at Gloucester, N. J.

LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interest of Lake Carriers, and improve the character of the service rendered to the public.

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FLOTSAM AND JETSAM.

Freezing weather is reported from all upper lake ports. The D. & C. boats are advertised to quit running November 30.

The government tug Lorain was damaged \$1,000 by fire at Menominee.

The Corrigan schooner Aurania came down last week with 141,000 bushels of wheat from Fort William, drawing only 13 feet 11 inches.

The lower gates of the new American Sault lock were tested last week, and pronounced eminently satisfactory by the government representatives present.

Deputy Collector of Customs W. B. Cody, at the Sault, has been given an indefinite vacation, and will doubtless be superseded shortly. No reasons given.

The steamer State of Ohio will leave on her last trip from Cleveland Wednesday, November 27, and Buffalo, Thursday, November 28, closing the season of 1895.

The last boat to lock down through the Sault last season was the Globe on December 6. Supt. McKenzie says the canal will probably be kept open still later this year.

Careful search in the St. Mary's River brought up the body of young Capt. Guy Gillette, temporarily in charge of the Manitou, whose disappearance was announced last week. His father, Capt. J. H. Gillette, of Marquette, took the body home for burial. He has the deep sympathy of many lake friends.

According to all reports, Capt. Ted Mullen, of the schooner Commerce, has passed through some rough experience since his vessel went ashore in Seul Choix Bay. Capt. Mullen and his mate recently started for Washington Island in a yawl boat to secure the services of a tug, but their boat was capsized in round Seul Choix Point, and before the two men reached the shore Capt. Mullen was nearly dead from exhaustion. He managed to crawl upon the beach, where he was found by the light keeper and cared for. Another start was made several days later, and the trip was made successfully. A tug was secured at the island, but had only started when she disabled her machinery and had to return. The Commerce has been moved toward deep water, and a tug is dredging a channel to her.

HYDROGRAPHIC CHARTS

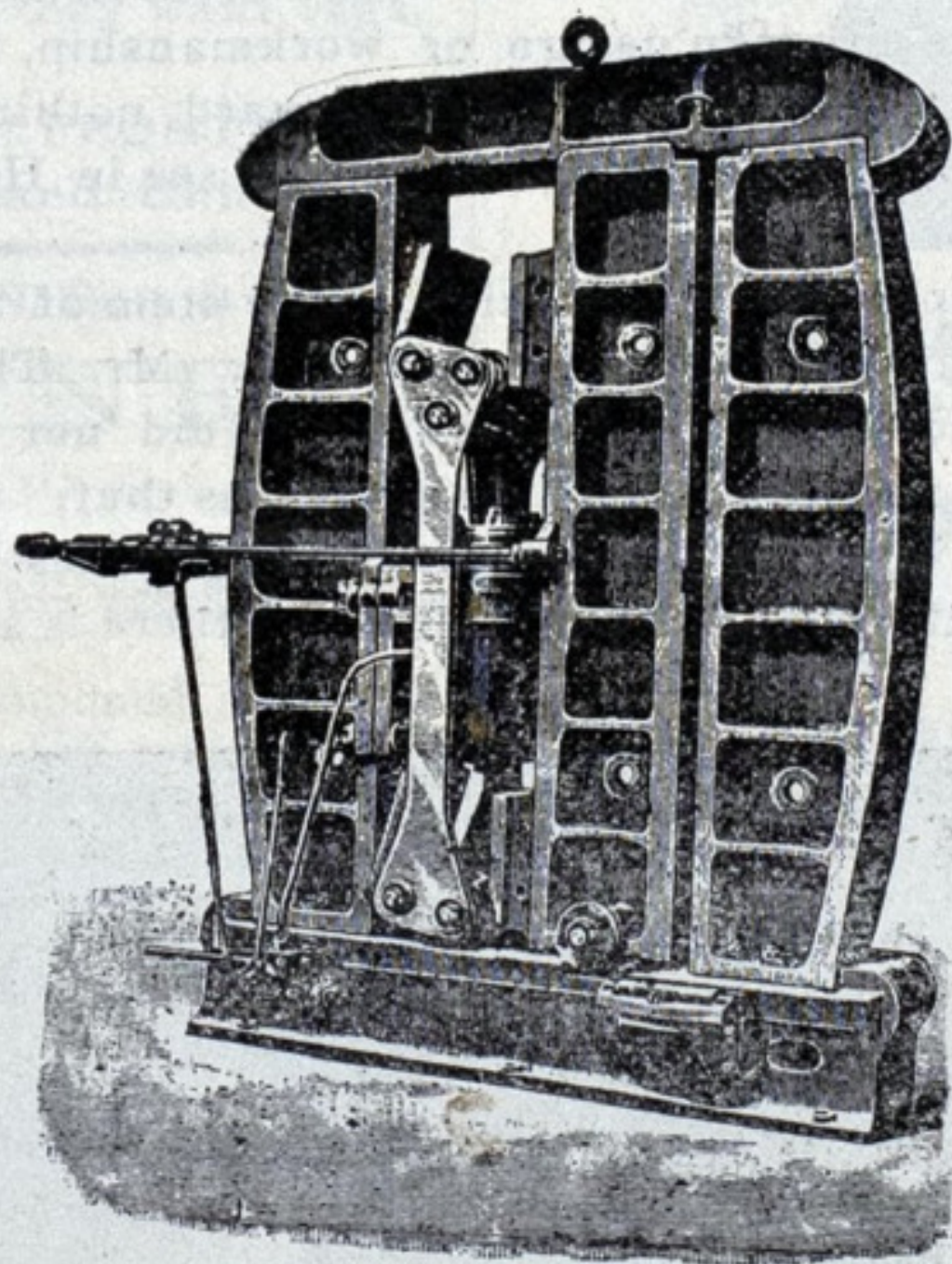
Of Lakes Erie, Ontario, Superior, Michigan, Huron, and St. Mary's, St. Clair and Detroit Rivers, for sale at the office of the MARINE RECORD, No. 144 Superior street, Cleveland. Prices 75 and 50 cents each.

HYDRAULIC BOILER PLATE BENDER.

(ILLUSTRATED.)

The machine shown in the accompanying illustration was designed to overcome the difficulties experienced in bending to a true circle throughout the heavy plates used in marine boiler work. When such plates are bent in rolls, the cost of machines sufficiently powerful to deal with plates, say, 1½ inches in thickness, is very great, and the risk of their fracture by overfeeding is very considerable. But apart from this is the difficulty in bending the plate to a true curve at the end which leaves the rolls last. The difficulties experienced were overcome, at the suggestion of the late Mr. R. H. Tweddle, of London, by placing the girders vertically, as shown in the illustration, and the adoption of the parallel motion for working the moving girder. By the use of this frictionless gear another trouble hitherto experienced in presses, which from their length require two or more hydraulic rams, was overcome. The difficulty in getting two or more rams on one long girder to travel at the same speed is well known, and this also tended to make untrue work.

The machine, as will be seen, consists of three vertical girders, the two outside ones being connected by top and bottom girders. The central one is moved in a perfectly parallel plane by a hydraulic ram working in a cylinder attached to the left-hand girder. On this girder are two inclined planes, and working on these are two sets of two rollers connected together by tie rods. The tie rods being pushed up by the hydraulic ram, the result is that the rollers, acting on the straight facings of the moving girder, push this forward for the



HYDRAULIC BOILER-PLATE BENDER.

desired distance. The outer face of this girder is concave, the face of the opposite girder being convex. A plate placed between these can be bent to any desired radius. It is not necessary that the girders be of the exact radius, and as made they suit all diameters of boiler shells. When desired, the machine is arranged so that a complete circle can be bent and lifted over the top of the right-hand girder. The practical results are: First, that the plate can be bent to a true curve to the very end; second, that narrow curved plates or cover plates can be bent as easily as complete shell plates; third, that it is impossible to overfeed and thereby break the machine.

As regards speed of working, a large plate, say, 1½ inches thick, 13 feet wide, can be bent with final curve at from 2 to 2½ feet per minute. There is no passing through the dies a second time. The mode of working is extremely simple. The plate having been placed on end on round steel bars about ½ inch diameter, resting on cast floor plates, in which are a number of square holes, something like those used for turning ships' frames, and also resting on the rollers on the bed plate of machine, the plate is easily fed forward by one man with an iron bar, of which one end enters one of the holes in the floor-plate. Some tack holes have been drilled in the edge of the plate, the iron bar catches a bar put into one of these, and the plate is then fed forward about 3 inches for each stroke of the bender. A second man works the valve, and with a gauge or template sees that the radius is correct. The whole apparatus is worked by three men and a boy. Another ad-

vantage is the small amount of floor space occupied by the machine, only 15 feet by 5 feet 6 inches being required for a machine capable of dealing with cold steel plates 1½ inches thick by 13 feet 1½ inches wide. The machine can also be placed in any part of the shop, and is not dependent upon position of shafting, nor does it require a steam engine attached. These machines are made to suit the Tweddle standard pressure of 1,500 pounds per square inch, but of course can be made to work at any other pressure if desired. The cost for foundation is nominal, and the total cost of installation low. The claims made for the machine, which is now in use by various governments, besides having been adopted by many firms at home and abroad, are rapidity of operation and more satisfactory work than that obtained by ordinary methods. By its use the plates are finished to the extreme end, any further manipulation after bending for that purpose being avoided, a true curve for riveting being presented.

TRIAL SPEED AND ACTUAL SERVICE.

The cruiser New York, for instance, is rated in all official publications as a twenty-one knot ship. From August, 1895, to October, 1895, the best run she made was at the rate of fifteen knots an hour, which was from Kiel to Gravesend, a distance of 685 knots, at the close of the canal celebration, burning 137 tons of coal. From Gravesend to New York she made fourteen knots, burning 882 tons of coal for 3,089 knots; but her average for the year was about ten knots.

The Columbia, rated officially at 22.8 knots, from New York to Southampton made 15.5 knots and burned 1,320 tons of coal for 3,315 knots. While returning under orders to make a record, she accomplished 18 knots, burning 1,553 tons of coal for 3,112 knots.

The Minneapolis is generally believed to be the fastest warship afloat, if pushed. She is rated at 23.063 knots, having averaged that for four hours between Cape Ann and Cape Porpoise. Her best speed in the last year was 14.3 knots, made on a run from Norfolk to New York.

The Baltimore, rated at 20.096 knots, flagship of the China station, presumably had some hurried orders during the recent Oriental excitement, yet her highest recorded speed was 12.7 knots, when she burned 111 tons of coal going 212 knots. In the opinion of naval experts she was doing almost her best, yet she developed less than 13 knots.

The Chicago was not in good condition last year, and has now been laid up for two years for repairs. Her record is 15.10 knots, but the best she did was 9.8 knots.

The Philadelphia, with her record of 19.678 knots, attained a maximum of 10.2, while the Newark accomplished 8.7, instead of her rated 19 knots.

THE FASTEST WAR SHIP IN THE WORLD.

The cruiser Buenos Aires, built in England by Armstrong, Mitchell & Co., for the Argentine Government is now considered to be the fastest war ship in the world. She is propelled by two screws instead of three, as in the Minneapolis. She is a sheathed steel boat, 396 feet between perpendiculars, 424 feet over all, 47 feet 2 inches deep, 47 feet 2 inches broad, and displacing, 14,740 tons. The Buenos Aires carries two 8-inch guns, four 6-inch guns, twelve 4.7-inch guns, and twenty-four smaller guns. Her conning tower is 6 inches thick. Her protecting deck is three inches thick on the sides, except that it is 5 inches thick over the machinery. She has five torpedo tubes, and her bow is a ram. Her estimated horse power was 17,000. The highest speed attained on her six-mile runs was 23.529, and for a six hour trial the figure was 23.202. The air pressure during the trial never exceeded four-tenths of an inch, and occasionally the stokeholes were open. The boiler pressure was 155 pounds to the square inch, and the mean revolutions of both engines averaged 151 per minute. Only natural draft was used, and the indicated horse power was approximately but 14,000.

ANOTHER LONG RECORD.

On November 15 and 16 the Long Car Dumping Machine, at Cleveland, established new records, as follows: 55 cars were dumped and their contents loaded as cargo and fuel on the steamer Forest City in 3 hours and 10 minutes; 25 of these cars were dumped in 55 minutes; on the steamer Outhwaite 4 cars were dumped in 4½ minutes; 6 cars were dumped in 6½ minutes, and 7 cars were dumped in 9 minutes.

NEW PATENTS.

(ILLUSTRATED.)

Following is a list of patents that have been recently awarded on inventions bearing on navigation, marine trade and relative matters:

No. 550,226. Life Preserver. Hiram D. Layman, Little Rock, Ark. Filed Nov. 17, 1894.

The accompanying cut does not portray either a bull-frog or a grasshopper, but another of the unique inventions of Hiram D. Layman, whose sporting boat has been illustrated and described in former issues of the RECORD. This life-preserver consists of a continuous tubular inflatable oval float body of greater diameter at its rear than its front end, and a flexible water-tight pantaloons suit encircled near its upper end by

said body, and connected to the same against the rear portion thereof, and having adjusting straps attached to the knees of the suit at one end and at the other end to the float. The suit is also provided with propelling paddles.

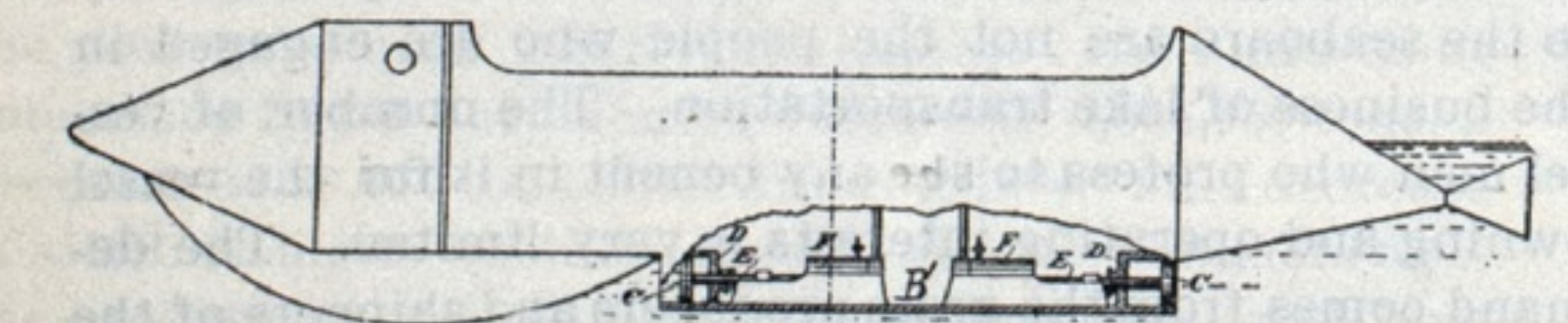
No. 549,923. Inflatable Boat. Hiram D. Layman, Little Rock, Ark. Filed November 17, 1894.

This is another of the unique Layman inventions. The claim is for a boat having a continuous tubular inflatable oval-shaped boat body of a greater diameter at the wide stern than at the narrow prow end, and a water-tight bottom piece attached to the bottom of said float body and fitted with water-tight leggings or boots continuous with and depending therefrom. A rudder is attached to the rear end of said oval-shaped body, and the boats are provided with weighted soles. Opposite to and connected with the leggings or boots are feathering paddles by means of which the boat is propelled. A conical shaped apron, with a hole at the top for the occupant's head, is fastened at the bottom around the outer edges of the oval-shaped inflatable body, and is provided with shoulder straps at its end.

No. 550,037. Device for Propelling Vessels. John Bond, Turlock, Cal. Filed June 20, 1895.

The claim is as follows: In a vessel, open-ended cylinders located below the bottom of the vessel, and standing in line with each other, having a length less than that of the vessel, pistons fitted to reciprocate in the tubes, near their ends, a chamber intermediate between the cylinders, separated therefrom by partitions, engines situated within the central compartment, and piston rods leading from the engines, in opposite directions, and connected with the pistons

The combination of a vessel having conical or pointed ends, open-ended tubes or cylinders entirely beneath



the bottom of the vessel, one at each end of a central compartment formed by depression of the bottom, said tubes or cylinders having their axes in line with each other and having pistons reciprocating within them, with their rods extending outwardly from opposite directions, and engines in said central compartment in line with the piston rods, adapted to be connected with said rods, one of said pistons, with its engine and connections, serving to propel the vessel in one direction, and the other set serving to propel the vessel in the opposite direction.

No. 550,046. Steering Apparatus. Joachim Johannsen, Lubeck, Germany. Filed July 6, 1895.

The claim is for the combination with a vessel provided with a vertical well, a transverse passage inter-

secting the lower end of said well, a steering shaft, a steering propeller secured to said shaft, mechanism for lowering the shaft into and lifting it out of said passage and a motor connected with and adapted to revolve said shaft, said motor moving up and down with the steering shaft, for the purpose set forth.

In a steering apparatus the combination of a casing *b* capable of being lifted in a vertical well *a* and lowered into a transverse channel *a'* of the vessel, of hollow arms *b'* projecting from the said casing and being closed at the bottom ends by means of caps *d* forming the bearings for the crank-shaft *s*, of a steering propeller *s* fixed to the crank-shaft and arranged between the said hollow projecting arms *b'*, and a motor *D* for driving the crank-shaft and steering propeller.

In a steering apparatus the combination of a casing *b* capable of being lifted in a vertical well *a* and lowered into a transverse channel *a'* of the vessel, of hollow arms *b'* projecting from the said casing and being closed at the bottom ends by means of caps *d* forming the bearings for a crank-shaft *s*, of a steering propeller *s* fixed to the crank-shaft and arranged between the said hollow projecting arms *b'*, and a motor *D* for driving the crank-shaft and steering propeller, of a movable bar *f* having wedge-shaped arms *f* adapted to act upon the correspondingly shaped gland *e* of the stuffing box, and of guide-pieces *g* for the said arms *f* substantially as specified.

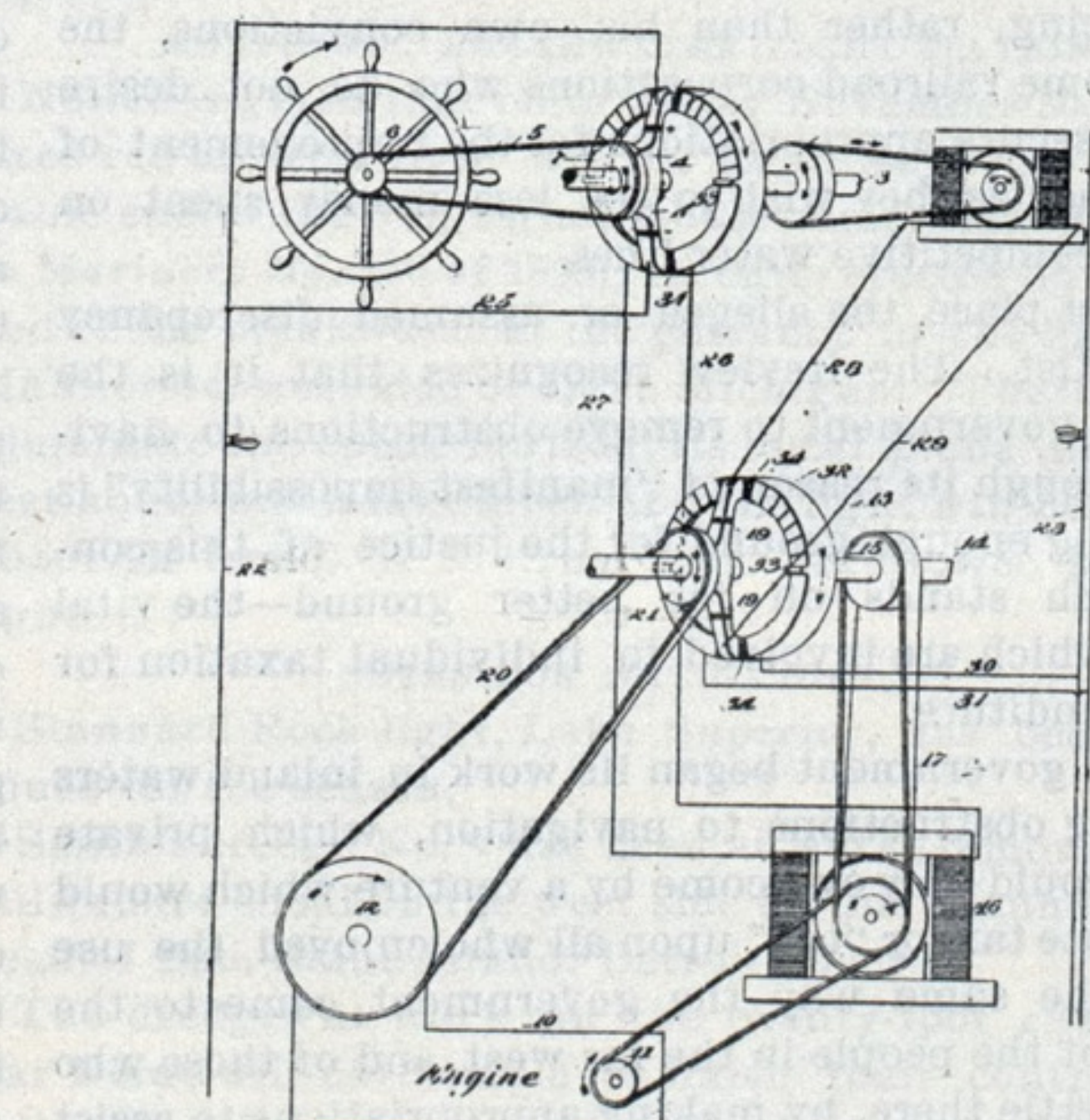
No. 550,001. Steering-gear for ships. William H. Harfield, London, England. Filed July 13, 1895.

The claims for a steering gear for ships or boats consisting of a tiller fixed to the rudder head, a chain wheel set eccentrically upon a driving shaft and a chain pass around the eccentric, the ends of the chain being connected respectively to arms on the tiller in the manner and for the purpose substantially as described.

No. 550,018. Electrical Steering Gear. Frank L. and Leonard H. Dyer, Washington, D. C. Filed October 4, 1894.

The claim in this application is exceedingly long, comprising in all some 61 paragraphs. It includes a method of controlling motors, which consists in constantly closing an electric circuit in which the motor to be controlled is placed, and by means of the controlled motor, in constantly completing a circuit in which is placed a second motor, which tends to constantly break the circuit of the controlled motor.

In an electrical steering gear, the combination of a steering engine, a valve for controlling the same, an electric motor mounted upon or adjacent to said steer-

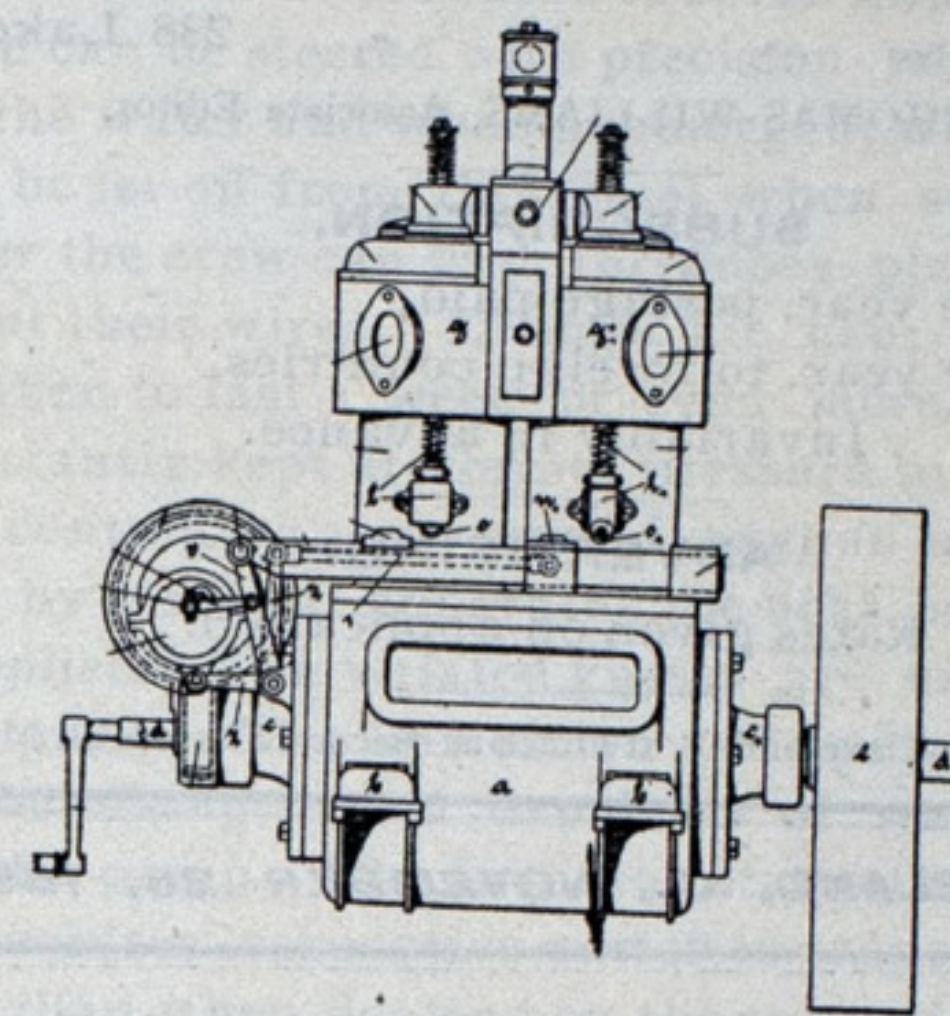


ing engine, whereby when said electric motor is operating the said valve will be kept constantly open; differential connections between said steering engine and said valve tending to constantly close the valve when the engine is operating; a revolving switch having independently moving contact arms at the bow of the vessel; a circuit or circuits from said switch to said electric motor; means for operating said contact arms,

whereby said circuit or circuits will be constantly closed; a second electric motor in the last-named circuit or circuits, connected with the switch at the bow of the vessel, and tending to constantly break the circuit of the main electric motor; and mechanical connections between the steering engine and a switch thereon tending to constantly break the circuit of the second electric motor.

No. 549,939. Marine Hydro-Carbon Motor. Willy Beck, Oberwesel, Germany. Filed September 12, 1895.

The claim is as follows: In hydro-carbon motors a valve gear for the exhaust composed of a reciprocating bar carrying two tappets acting on the valve rods in their to-and-fro motion, one being rigidly secured to the bar and the other sliding thereon, said bar with the fixed tappet being guided by a swinging lever connected



to a crank pin, the shaft of which is geared to make one revolution, while the motor shaft makes two; the other sliding tappet being guided by a bell crank lever, one arm of which is connected to the tappet by a link, while the other arm is connected to an eccentric keyed upon the same shaft carrying the crank aforesaid.

In hydro-carbon motor is a vaporizer for coal oil composed of a nozzle communicating with an oil vessel, being upwardly directed into a tube which is being contracted near the opening of said nozzle, and arranged to allow air, aspirated by the pistons, to pass through and around said tube, whereby the hydro-carbon is aspirated, pulverized and mixed with air in combination with a casing 3, provided with a cross partition 4, and provided with means to be heated.

A full description of these patents can be obtained by writing to the Patent Office at Washington, enclosing 14 cents for each, and mentioning THE MARINE RECORD.

THE Bureau of Steam Engineering has given up its efforts to obtain satisfactory nickel-steel for the boilers of the Chicago. A sufficient amount of this material has been assembled at the New York Navy Yard for the construction of one boiler, and the other boiler will be made of ordinary boiler steel. The trouble with nickel steel is, according to the engineers, that smooth joints cannot be made.

VISIBLE SUPPLY OF GRAIN.

As compiled for THE MARINE RECORD by George F. Stone, Secretary Chicago Board of Trade, November 23, 1895.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY Bushels.
Albany		17,000	85,000		50,000
Baltimore	485,000	720,000	255,000	99,000	
Boston	755,000	251,000	14,000		
Buffalo	2,264,000	216,000	53,000	403,000	1,301,000
Chicago	21,479,000	1,139,000	505,000	231,000	37,000
Cincinnati	43,000	5,000	41,000	40,000	99,000
Detroit	465,000	10,000	27,000	13,000	4,000
Duluth and Superior	5,449,000		318,000	138,000	729,000
Indianapolis	171,000	103,000			
Kansas City	1,327,000	5,000	64,000	28,300	
Milwaukee	698,000		1,000	155,000	72,000
Minneapolis	15,548,000	3,000	624,000	108,000	120,000
Montreal	246,000	2,000	39,000	3,000	16,000
New York	6,330,000	651,000	2,075,000	16,000	37,000
Oswego	390,000	26,000	25,000		
Peoria	29,000	44,000	399,000	4,000	
Philadelphia	176,000	172,000	238,000		
St. Louis	1,429,000	21,000	536,000	18,000	17,000
Toledo	1,042,000	101,000	237,000	126,000	
Toronto	91,000		26,000		29,000
On Canal	1,000,000	232,000	238,000		1,078,000
On Lakes	2,709,000	841,000	240,000		1,238,000
On Mississippi			15,000		
Grand Total	62,221,000	4,642,000	6,055,000	1,382,000	4,957,000
Corresponding date 1894	83,944,000	3,840,000	9,191,000	442,000	3,949,000



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WILLIAM L. McCORMICK, - - - EDITOR.

BRANCH OFFICE,

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CLEVELAND, O., NOVEMBER 28, 1895.

No busy freight market will prevent brokers from enjoying their turkey at leisure.

FREIGHTS have been high, turkeys are cheap, and the insurance companies are prompt in settling losses. This ought to be a merry Thanksgiving day.

THE late storm did not confine its assaults to half a dozen vessels. Much damage to property was wrought at the foot of Lake Erie. Squaw Island and much other property along the upper Niagara were submerged, and the water swept over the falls with such impetuosity as to raise the lower river thirty feet.

THOSE interested in the lakes should pay particular attention to the formation of the River and Harbor Committee in the next House. Two old members of the committee, Mr. Stephenson, of Michigan, and Mr. Hooker, from the Fredonia district, of New York, are both mentioned for the chairmanship, and their claims should be pushed vigorously.

A STRIKE of ore handlers at Ashtabula, who have virtually taken up the fight of the trimmers at upper lake ore shipping ports, has been the means of diverting a considerable amount of ore from that to other ports. The strike seems to have been ill-advised from all standpoints, particularly so as to chances for a victory for the laborers. A lockout has resulted. The ore dealers and dock companies have little or nothing at stake, as shipments are at an end. The ore handlers have lost the chance to earn many dollars toward their winter's support.

CONGRESS should adopt a policy of systematically co-operating with municipalities in the improvement of harbors. This plan has worked very successfully at Ashtabula and Lorain. Cleveland offers to make a similar arrangement, and the Federal government owes it to itself to preserve the expensive works it has already erected at this port. The Maritime Board has taken pains to demonstrate that the \$100,000 estimated by General Craighill is a pittance compared with what should be appropriated for the work that ought by all means to be done next season.

THE New York Herald is authority for the statement that the report of Col. William Ludlow and his associates on the Nicaragua canal investigating commission have reported adversely, and have estimated the cost of constructing such a waterway at \$133,000,000 instead of the \$19,000,000 talked of by the canal company. They ask that Congress looked into the matter further, but state that they are by no means sure the canal could be built for the larger sum. They state that physical conditions were not properly inquired into, and that some of the engineering problems were not properly solved.

GOVERNMENT AIDS TO COMMERCE.

The Railway Review published, a few weeks ago, a lengthy article under the head of "Government Appropriations for the Maintenance of Commerce." The RECORD's attention has been called to it, with a suggestion that the subject be discussed in these columns. The article opens with a reference to the Deep Waterways Convention, held in Cleveland, and then reviews the various methods of which governments have, from the earliest times, encouraged commerce by building highways of communication on land and water. The writer then feels his way into the reason for continuous government appropriations for river and harbor improvement. He lays especial stress upon the fact that the government exercises close supervision over the railroads in the matter of charges, while a vessel may charge what it pleases or refuse to perform the service altogether. He then concludes as follows:

If these premises are correct it is somewhat difficult to perceive upon what grounds an appropriation for the improvement of a waterway can be asked for that would not apply with equal force to a railway. It is probably true that a deep waterway to the seaboard would result in the cheaper movement of the commerce of the country, but it is at least doubtful if the expenditure of a sum equal to the amount required for the construction and maintenance of such a channel would not, if devoted to the improvement of railways, result in an equal benefit to the country. The present yearly appropriation for the maintenance of the conditions necessary to safe transportation by water is apparently justified, and yet it is probable that if the same amount of money was devoted to providing safety appliances upon our railroads a larger saving of life would result. It is of course manifestly impossible to provide means for the safe running of railway trains under present conditions unless by government. If the vessel interests navigating our lakes and rivers, although free to charge what they please, cannot properly chart, buoy and light these channels of commerce because of the expense involved, and therefore have it done for them by government, upon what theory can it be claimed that a railroad company whose outgo is largely prescribed and whose income is altogether regulated by government, should be denied such aid in the erecting of proper signal appliances, and thereby subject a much larger number of passengers to danger than is possible in the other case.

It is not claimed that the time has come when government should appropriate money to make transportation by rail as safe and as cheap as possible, but it is questioned if any further appropriation of the public monies should be made for the improvement of any one particular branch of commerce. Vessel owners may not be able to carry on their business profitably under the present conditions, but that is no reason why the public should be taxed for their particular benefit. Deep water channels of communication are no more necessary for the promotion of commerce than are well built and completely equipped railways; indeed it is scarcely doubtful if the latter are not the more valuable of the two. There would seem to be no good ground, therefore, why the resolutions adopted by the Deep Waterways convention should be seriously regarded by Congress, at least unless it can be shown that some greater good than is now apparent shall result therefrom.

The writer of the above article displays great power of debate, even with a poor case; but his style seems to indicate that he is writing against his own conscience, and is voicing, rather than his own convictions, the plaint of some railroad corporations who do not desire so much to secure appropriations for the improvement of their railroads as they wish to see less money spent on deepening competitive water lines.

In the first place, the alleged or assumed discrepancy does not exist. The Review recognizes that it is the province of government to remove obstructions to navigation, although its reason of "manifest impossibility" is hardly strong enough ground for the justice of this condition, which stands on far better ground—the vital principles which are involved in individual taxation for public expenditure.

The U. S. government began its work in inland waters by removing obstructions to navigation, which private enterprise could only overcome by a venture which would levy a private tax, or "toll" upon all who enjoyed the use of it. In the same way the government came to the assistance of the people in the far west, and of those who wished to settle there, by making appropriations to assist the companies constructing trans-continental railways. This was direct assistance to individuals, while the expenditures on the water were a general gift to the people at large. True, as the Review states, the great masses of people are benefited by railway construction, as truly as by waterway improvement; at the same time the benefits to be enjoyed are limited. Anyone can ship his products to market, by paying the freights, as rapidly, if not so

cheaply as by water; but only one individual or corporation, can carry on business directly over each road, whereas, on the other hand, the Elizabethan proverb is thrust forcibly forward, that "the sea and air are common to all men." Anyone is at liberty to buy or build a boat of any class and to operate it upon these great water highways, provided he offers no obstruction to commerce and does nothing to menace public safety. The analogy here to turnpikes and other wagon roads is very close. If the Review should urge that it requires large sums of capital to build such boats as now ply the lakes, it can be promptly met with the reply that these boats are in nearly all cases owned in small shares, many of the stockholders being men of very moderate means. The Review does not need to be told what show the small stockholder in a railroad company usually stands.

The great design in public expenditure for waterway improvement, is however, the carrying out of the old established principle—the greatest good to the greatest number. Water routes are conceded to be the cheapest medium of transportation. The more the waterway is improved, the cheaper becomes the operation of boats: more capital is attracted, more boats are built, and keen competition still further reduces freights. Government aid to a railroad company could be nothing but a gift to an individual, and it would require a very clear demonstration of a great commercial boon to a great stretch of territory and its inhabitants to make such an appropriation constitutional or justifiable. This occasion arose in the construction of Pacific roads, but these conditions have not since been paralleled.

And now as to government supervision. This is purely a police matter. Water freights, by reason of the facilities for competition, have always been governed by the laws of supply and demand. This is true of railroads in a very remote sense, and the facility for combinations is open to railroads which is impossible on water. It is true that railroad freight agreements rarely hold for any length of time, but the reason for breaking them in this section can nearly always be traced to water competition. The government was finally compelled to take cognizance of these and other abuses by which unjust discrimination in favor of particular interests as against the general public, and to inaugurate a system of continuous supervision.

The Railway Review has also given evidence, in the above extract, of some misapprehension in regard to the proper interpretation of "safe navigation," and causes confusion by comparing it with requirements for safety appliances on railroads and their equipment. Most of the beacons, buoys, and channel marks on the lakes, as well as the improvement of channels, are all provided mainly with the idea of securing "safe navigation" from a financial point of view. Of course they are frequently the means of saving life, but only because they guide the ship from the path of danger. If the Review will investigate, it will find that the requirements from railways in the matter of appliances calculated to prevent loss of life and limb are by far fewer than the precautions required by law on water, and that supervision of railroads in this respect is of far more recent date. In addition to the regulations for vessels in this department, a large corps of inspectors is employed to see that these rules are rigidly adhered to. The burden of expenditure in this branch is always borne by the vessels.

In conclusion, stress must be laid on the fact that the great moving forces in the agitation for a deep waterway to the seaboard are not the people who are engaged in the business of lake transportation. The number of vessel men who profess to see any benefit in it for the vessel owning and operating interests is very limited. The demand comes from the grain producers and shippers of the great Northwest, who are not pushing the movement to benefit the vessel owner or the ship builder, but to secure ultimately for their section still lower rates of freight, in order that they may meet the competition of other countries in getting their produce to a market for consumption. If such a waterway is ever secured it will be a concession to the west of Canada and the northwestern part of the the United States, and not to the shipping interests.

During October Scotch shipbuilders launched 21 vessels of 30,791 tons, against 37 vessels of 39,048 tons in September, and 29 vessels, of 22,781 tons, in October last year, for the nine months of 1895, 317,870 tons have been launched. English shipbuilders launched 19 steamers, as compared with 24 in September.

SHIP BUILDING AND REPAIRS.

MUCH TO BE THANKFUL FOR.

With an unusual amount of tonnage now under construction at lake shipyards, the Thanksgiving season finds several more contracts drawing to a head, some of which will probably be announced in the daily press before the next issue of THE RECORD. These contracts will give the lake shipyards nearly their full quota of work all around.

The new boat which Abram Smith & Son, of Algonac, Mich., have begun on their own account, is to have a capacity of 1,200,000 feet of lumber, or 1,800 tons of coal. She will have the highest rating, and will be a model in every respect for her class. She will be 210 feet long between perpendiculars, by 37 feet beam and 14 feet hold, schooner rigged, with steam windlasses, etc. She will be built entirely of white oak, diagonally strapped, with steel arches and keel plates.

Things are booming at the works of the American Steel Barge Co., at West Superior. Four hundred men are now regularly employed and within a few days that number will be increased to 500. Capt. McDougall says that the company has half a million dollars' worth of work piled up and that he is figuring on several contracts with good prospects of securing them.

Mr. John Carley, of Barrie, has just launched a sloop yacht. The craft is 22 feet 6 inches over all, water line 17 feet 6 inches, beam 7 feet 2 inches; with center board she draws about six feet and carries 500 feet of canvass.

REPAIR WORK.

The Cleveland Ship Building Co. has an extensive job on the steamer J. B. Ketcham, which is lying at their yard. She was badly damaged by last week's storm on Lake Huron, rolling out her masts and getting her bulwarks badly smashed. Repairs will be completed Saturday or Monday.

Wooden repair work at the dry-docks has been exceptionally dull. The Ship Owners' Dry-Dock Co. finished repairs on the Whitaker, noted last week. At the Cleveland dry-dock the tug Gordon, of Ashtabula, received repairs to her stern bearings, and the tug S. S. Stone is in for a new shoe.

J. G. Laird & Sons, of Ashtabula, will make extensive repairs this winter on the steamer Inter Ocean, which is laid up there. Among other things she will be given a new deck.

The schooner H. C. Winslow, of Sturgeon Bay, which was damaged last week by collision with the schooner Perry, will require considerable money for repairs this winter. She has been laid up at Sturgeon Bay. Her owner, Capt. Alec Larsen, had intended before the collision to expend about \$1,000 in new decks, rail, etc., but she will now require an entire new bow before being seaworthy, and twice the sum named will have to be spent on her.

The J. Emery Owen and consort stopped at Detroit for a few minor repairs on the way up. All three are now ashore near Chicago, and they will be in for larger jobs if they are lucky enough to get off safely.

F. & P. M. steamer No. 4 has been having an overhauling at Manitowoc before entering winter service.

COMMISSIONER CHAMBERLAIN'S ANNUAL.

The annual report of the Bureau of Navigation shows that the numbers and tonnage of our merchant fleet for the year have been nearly stationary. On June 30 it comprised 23,240 documented vessels of 4,635,960 tons, a decrease of 50,000 tons since June 30, 1894. This decrease is attributable to business inactivity two summers ago, the production of our shipyards in April, May and June this year much exceeding the production during the same months in 1894. Our fleet on the Great Lakes alone outnumbers the fleet of any nation except England and Germany. The report is devoted chiefly to recommendations for the repeal of many of our navigation laws of the last century, which were copied verbatim by the earliest Congresses from laws of King George III. Passage of the free ship bill is again recommended.

The repeal of the law exempting from tonnage taxes in our ports vessels coming from ports in which our vessels are exempt from that tax is strongly recommended. During the seven years of its operation American vessels have been relieved of about \$10,000 taxes in German ports, while we have exempted German vessels of nearly \$500,000. Similar revelations, though not on so large a

scale, it is stated, follow examination of returns from other countries which have come under this law. The report also recommends a reduction from three cents to two cents per ton tonnage tax on vessels from near-by ports. Free shipbuilding materials for American vessels in the coastwise as well as the foreign trade is recommended, and the repeal of eighteen sections or statutes relating to minor matters is advised on the ground of their uselessness.

ORE MOVEMENT NEARING A CLOSE.

Shipments of iron ore from Ashland closed Monday, the total for the season being 2,350,225 gross tons, of which the Northwestern dock shipped 1,201,978 tons and the Wisconsin Central 1,148,247. This total is 122,818 tons, better than the record of any previous season. The shipments from the Northwestern dock were from the Gogebic mines. There was also shipped from Escanaba about 120,000 tons from the Windsor, Palms, and Norrie mines, making the total movement of ore from this range about 2,470,000 tons.

Estimated shipments from the Minnesota ranges for this season are 3,335,006 tons, an increase of 1,116,000 tons over 1894. The Mesaba range shipped 1,537,000 tons, the Vermillion range 1,798,000 tons. Shipments from Duluth and Two Harbors are practically at an end. Production has far exceeded the shipments and there are already big stockpiles which will be largely augmented during the winter. A considerable quantity of ore already sold is included in these stockpiles, special arrangements having been made with furnace men not to bring it down until next season.

Estimates based chiefly upon the figures above given, taken in connection with the figures of ore tonnage passing down through the American and Canadian canals at St. Mary's Falls, place the shipments from Marquette in the neighborhood of 1,500,000 tons. Escanaba and Gladstone shipments are thought to be something more than 2,000,000 tons, which will bring the total for the season to about 9,700,000 tons, by far the heaviest shipments on record. The amount received at various ports is estimated about as follows: Ashtabula, 2,550,000 gross tons; Cleveland, 2,450,000; South Chicago, 1,800,000; Fairport, 935,000; Erie, 600,000; Buffalo, 500,000; Conneaut, 300,000; Lorain, 225,000; Huron, 120,000; Sandusky, 100,000; Toledo, 100,000.

NOTICE TO MARINERS.

FOG SIGNAL AT EAGLE HARBOR.

Notice is given that, on or about November 30, 1895, there will be established at this station, on the north side of the entrance to Eagle Harbor, west side of Keweenaw Peninsula, Lake Superior, a 10-inch steam whistle to sound, during thick or foggy weather, alternate blasts of 3 to 6 seconds, separated by alternate silent intervals of 12 and 24 seconds' duration. The fog-signal building is a brown corrugated iron structure, and stands 100 feet N. 30° W. (NNW. $\frac{3}{4}$ W.) from the light tower.

MANITOWOC BREAKWATER LIGHT-STATION.

Notice is given that on or about November 30, 1895, a fixed red lantern light will be established on the SE. gable end of the fog signal house (described in Notice to Mariners No. 170 of 1895), recently erected on the SE. end of the breakwater at the entrance to the harbor of Manitowoc, west side of Lake Michigan. The light will illuminate the entire horizon, its focal plane will be 34 feet above mean lake level, and the light will be located about 530 feet E. $\frac{3}{4}$ N. (true) from Manitowoc pierhead light.

NOTES FOR NAVIGATORS.

Stannard Rock light, Lake Superior, has been abandoned for the season.

Smith's dredge No. 9 has been at work removing the Milwaukee shoal on the west side of the channel at the head of Bois Blanc Island, Detroit River.

The dredges at work on the twenty-foot channel at Bar Point will not be able to finish their contract this fall, and will have to resume work next spring. The weather for several weeks past has been so rough that they could not work half the time; or the contract would have been finished this fall.

HYDROGRAPHIC CHARTS

Of Lakes Erie, Ontario, Superior, Michigan, Huron, and St. Mary's, St. Clair and Detroit Rivers, for sale at the office of the MARINE RECORD, No. 144 Superior street, Cleveland. Prices 75 and 50 cents each.

A SUBMARINE PASSENGER BOAT.

It is stated that M. Goubet, of Paris, who has just built a submarine torpedo boat for the Brazilian government, has prepared all the drawings for a submarine passenger boat, in which, he says, sea-sickness will be an impossibility. The Channel will be crossed by this vessel in 45 minutes, instead of 90 minutes. The boat will travel at 20 yards or more below the surface of the water, and will run on a steel cable. The new torpedo boat is being tried in the Seine, and it is expected to demonstrate the following: The habitableness and stability of the boat; whether she can float on the surface, sink to any given depth, rise again to the surface at will of its captain as often as may be judged fit; whether when submerged she can be propelled by her one-horse-power electric motor at the speed of seven knots an hour; whether she can be steered with precision when on the surface of the water and when submerged; whether torpedoes can be let off from the vessel when submerged; and whether the crew can find torpedoes placed in the river and cut their wires. Enough air can, it is said, easily be taken to last a week or even more. The air will be constantly kept at normal pressure by means of steel tubes containing a mixture of oxygen and ozone, with which by a special apparatus the boat is kept constantly supplied. The vitiated gasses are expelled by means of a pump. The immersion and emersion are effected by the taking in and expulsion of water-ballast by means of a pump. The inventor states that the torpedo boat requires less motive power to propel her when submerged than when floating on the surface. She will be propelled by the same electric motor that works the pump, which is of $1\frac{1}{2}$ horse-power, of which $\frac{1}{2}$ horse-power is calculated for working the pump, etc. The crew will consist of one officer and two men, and the boat will generally carry three compressed air tubes, which will enable the crew to remain submerged in the boat for 12 or 15 hours without inconvenience.—Fairplay.

NOTES.

THE Russian government is considering a projected canal between the Baltic and Crimean ports, at an estimated cost of \$50,000,000. There are no great physical difficulties to overcome. The canal will start at Riga, following the Dwina, and, further on, the Beresina and the Dnieper, entering the Black Sea at Cherson. It will be 1,000 miles long, 250 feet wide and 30 feet deep.

THE reason why ships are not struck by lightning is attributed to the general use which is now made of wire rope for rigging purposes, as well as to the fact that the hulls of ships are usually constructed of iron or steel. Thus the whole ship forms an excellent and continuous conductor, by means of which the electricity is led away into the ocean before it has time to do any serious damage.

ENGINEER-IN-CHIEF MELVILLE wants \$1,351,195 to keep his wheels greased for the coming year. The bureau is still experimenting with water-tube boilers. Conservative as it is, it is in advance of every marine engineering establishment in America in this respect. It proposes to have experimental tests of liquid fuel. Some means must be devised to increase the number of engineer officers.

THE great Carnegie steel works, at Homestead, Pa., cover 300 acres of ground, represent a developed machinery force of 80,000 horse-power, pay men five times the wages paid in Germany, turn out in a day more freight than is carried on the whole Boston & Albany system, and produce, with 4,000 men, six times the output of the Krupp works in Germany, which employ 12,000 men. All the fuel used is natural gas, but for minor operations a central station operates in various departments 300 electric motors.

THE proposition to connect the Mediterranean with the Atlantic by a canal across France meets with much opposition, and the late Admiral Courbet argues that the cost, \$400,000,000, might much better be spent on battleships. The canal will cut through no less than 239 lines of communication, and it is proposed to meet this difficulty by means of 163 swing bridges and the construction of tunnels. The southern exit into the Mediterranean is some distance from Toulon and must be specially fortified, while the northern exit at Bordeaux is 117 miles from Rochefort, 220 miles from Lorient, 295 miles from Brest and 470 miles from Cherbourg.

IN THE ENGINE ROOM.

FORCED DRAUGHT AND INDUCED DRAUGHT.

As much interest is at present centered on the merits of forced as against induced draught on the high speed steamers the following particulars given by the London Marine Engineer may be useful:—

In forced draught, the stokeholds or boiler rooms are capable of being closed to the atmosphere by suitable doors, and air for the furnaces of the boilers is then obtained by means of centrifugal fans revolving at high speeds. These fans draw, or pump, air from the upper portion of the ship, or the atmosphere, and deliver the air into the stokeholds. Until this air can escape there will naturally be a greater pressure of air in the closed stokeholds than in the ordinary atmosphere on deck, and the extent of the air pressure is measured by water gauges placed in the stokehold, the action of the gauges being similar to the action of the ordinary atmosphere barometer. The only means by which the air can escape from the stokeholds when closed, is through the fire grates or furnaces of the boilers, and in passing through these grates at a pressure greater than ordinary atmospheric pressure, a greater quantity of air is supplied to the furnace in a given time, and hence the combustion of the coal, the production of heat, and the generation of steam become more rapid.

With the induced draught the stokeholds are kept open to the atmosphere, but the position of the centrifugal fan is different. It is placed in the base of the funnel—and in revolving causes a partial vacuum at this part of the boiler, the action of the fan being to expel the heated gases from the fires upward through the funnel with the air, and by so doing to induce a quicker passage of air from the stokeholds through the furnace grates into the funnel and atmosphere. In both cases more rapid production of heat from the fires, and therefore a quicker generation of steam, is attempted; the main idea of each system being to pass larger volumes of air through the fires in the furnace than would be the case when the vessel was relying upon natural draught only.

Forced draught therefore means fitting up an air pressure in the stokeholds; induced draught means creating a partial vacuum in the base of the funnel. In the former case the air is pushed through the furnaces, in the latter it is pulled.

AN IMPORTANT DATUM.

Although rarely mentioned in the report of a boiler test, the amount of coal burned per square foot of heating surface is an important figure, more so than the generally quoted combustion per square foot of grate. A pound of coal gives off so many heat units when burned. How much surface must be provided to absorb this heat? The question of combustion per square foot of grate is one of capacity. Burn as much as you can with perfect combustion, and make your ratio of heating to grate surface large enough to absorb the heat generated. What we should like to see settled is the proper amount of coal to burn per hour per square foot of heating surface.—Power.

IMPORTS OF BRITISH IRON AND STEEL.

The following table compiled from the returns to the Board of Trade, London, gives the latest figures on British iron and steel exports into the United States. The exports for the month of October this year, together with those of the corresponding month last year are given. The table shows also the iron and steel exports for the ten months closing with October last, and those for a similar period closing with October, 1894:

	October.		Ten Months.	
	1894.	1895.	1894.	1895.
Pig Iron.....	1,160	6,591	9,218	24,673
Bar angle and bolt iron.....	25	203	729	1,213
Railroad iron and steel.....			9	6,967
Hoops, sheets and boiler plates.....	29	441	5,820	3,935
Tin plates and sheets.....	24,854	19,805	179,820	185,682
Old iron.....	12	601	1,285	2,255
Steel, unwrought.....	2,251	1,903	13,606	13,691
Wire, iron and steel.....	440	369	3,664	4,447
Black plate for tinning.....		740		7,710
Total.....	28,771	30,653	219,151	250,573

The main feature of these statistics is increasing exports from Great Britain to the United States. Thus the exports during October compared with those of the corresponding month last year show an increase of about 6 per cent. Pig iron exports increased greatly,

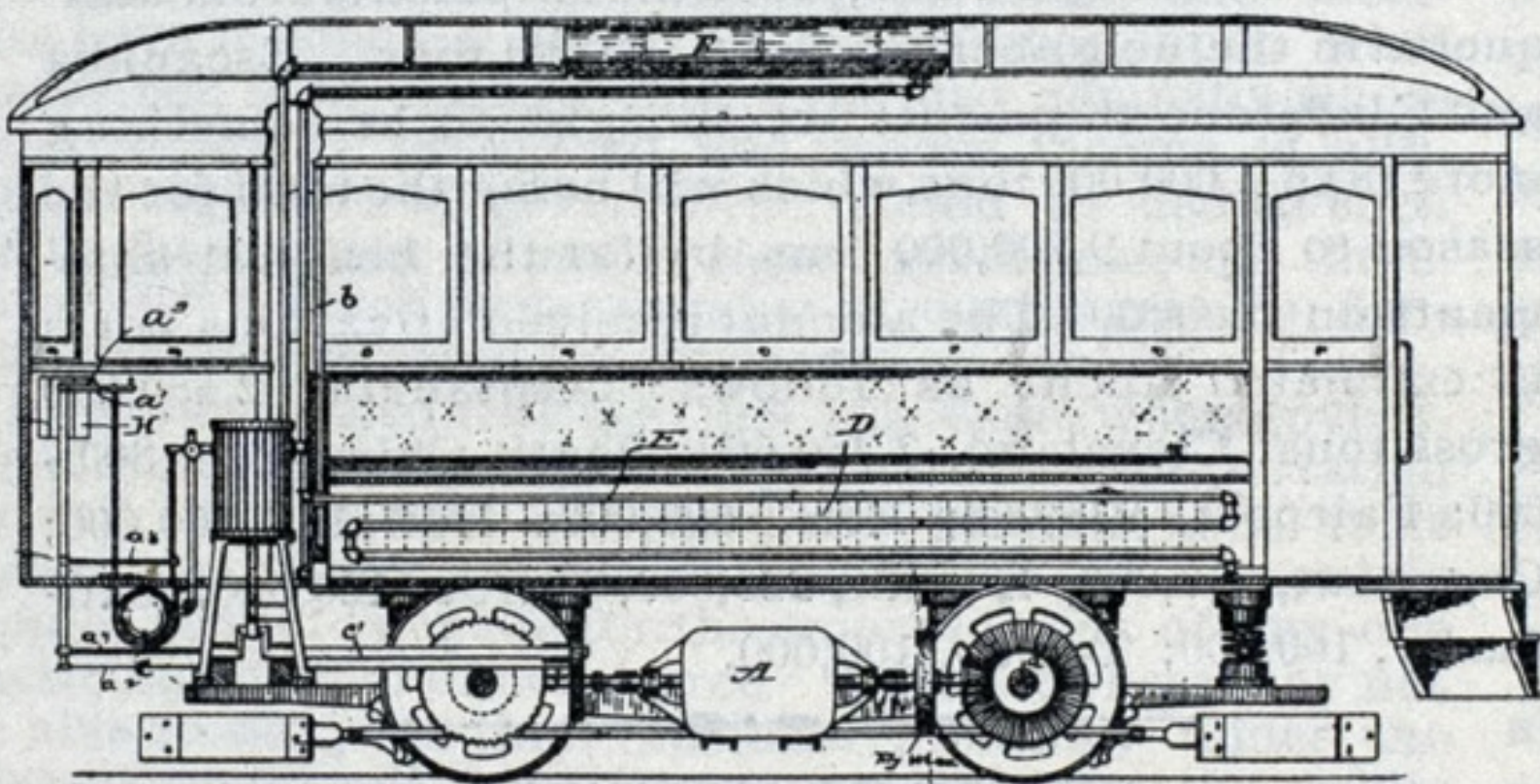
as the difference was nearly 600 per cent. Bar, angle and bolt iron, hoops, sheets and boiler plates and scrap iron all show increased exports. The only items showing decreased exports are soft steel and wire, the former amounting to 15 and the latter 16 per cent.

Comparing the total British iron and steel exports to the United States during the ten months' period ending October 31 last with those of a similar period closing October 31, 1894, an increase of over 14 per cent is seen. Again iron shows a big increase, amounting to 59 per cent. Exports of bar iron increased 66 per cent, and while the exports of steel rails during the earlier period amounted to but nine tons, those exports during the latter period were increased to 6967 tons. Tin plate exports show a big increase, and exports of scrap material increased over 75 per cent. Soft steel shows an increase of 26 per cent, while wire figures are more than 21 per cent higher. In comparing the two ten months' periods but one instance of decreased exports is seen, and that is in hoops, sheets and boiler plates, and it amounts to 32 per cent.

A SELF-PROPELLING VEHICLE-BOAT.

(ILLUSTRATED.)

Mr. George A. Washburn, of the United Motor Co., Cleveland, has invented a vehicle, self-propelling, for either land or water, which seems to be a proper device to place on the lines passing over the viaducts. He has just obtained a patent on this device, No. 550,008, his application having been filed March 6, last. This patent seems to cover the motive power only. It provides for the combination with a driving shaft or axle and a prime mover for rotating the same, of a dynamo-motor connected with and adapted to be driven by the prime mover, means for connecting and disconnecting



MR. WASHBURN'S INVENTION.

the dynamo-motor and driving axle or shaft independent of the prime mover, an electric accumulator arranged and adapted to have electric energy stored therein by the dynamo-motor, and means for automatically actuating the dynamo-motor as an electric motor by the energy stored in the accumulator, to independently rotate, or to assist in rotating the driving shaft.

THE FINEST IN THE NAVY.

The battleship Indiana, which was illustrated in THE RECORD two weeks ago, was placed in commission at League Island on the 20th. The Indiana has proven herself to be the finest vessel in the navy and a leader in her class in the world. The Board of Inspection and Survey has made its report to the department on the trial of this vessel, and found that she failed to come up to requirements in only one respect, and that was in regard to the time required to put the helm over from hard aport to hard astarboard. The requirements called for 20 seconds. The time actually occupied in executing this maneuver on the battleship was 38 seconds. The official speed made on her trial, upon which the Cramps' claim for premium will be considered, is 15.5468 knots an hour. Members of the board say that if the Indiana's bottom had been clean she would have made 16 knots. As a result of the Indiana's performance the Cramps' will receive a premium of a little more than \$50,000.

Though American shipping has to a large extent disappeared from the ocean through American capital having found investments more profitable in internal development, we must not forget that we are sons of a seafaring race and through all our history its noblest episodes, its most heroic daring, its greatest victories have been associated with the sound of the sea.—Marine Journal.

INTRODUCING THE CASE WHEEL.

In the issue of March 7 last, THE RECORD printed an illustrated article of some length upon propeller wheels, and of the outward thrust, as shown in the various patterns invented by Mr. J. Wells Case, of Highland Park, Conn., in particular. Mr. Case's theories, by which he arrived at the conclusions on which he bases his style of propeller, were at that time fully described, and doubtless read with interest by those whose business it is to equip steamers. When it came to the introduction of his wheel, however, Mr. Case found that owners in general, as a rule, understand very little, and care less, about the motion of the wheel under water. What they do care about, however, are the results, and the wheel which makes the best showing upon actual experiment is the wheel which they will buy and recommend. Mr. Case has had an arrangement with the Gas Engine and Power Co., of New York, dating from the spring of 1893, by which this company manufactures his wheels and conducts his tests. Mr. Case has so far confined his tests to yacht wheels, although he is now ready to furnish any size. One of his latest and notable experiments out here in "the west" has been with the steam-yacht Bonita, owned by Mr. Mark Hopkins, who is chief owner of the big steamship Centurion. The Bonita is well known on the lakes as a fast boat, and is one of the finer lake yachts, her length between perpendiculars being 110 feet by 16.6 feet beam and 6.6 feet depth. Mr. Case's suggestion that one of his wheels be placed on the Bonita was met with a rather stiff offer on the part of the owner when agreeing to give it a trial. The proposition was substantially as follows: The Bonita had been in the habit of making a certain run on St. Clair River in 33 minutes. She was to be docked, and a Case wheel put on, and if she made the same trip thereafter in 32½ minutes, the wheel was to be purchased, and the Bonita was to pay the expense of putting it on. On the other hand, if she did not come up to that record, Mr. Case was to pay the expense of docking the yacht twice, of placing his wheel and removing it, and of replacing the Bonita's old wheel. Mr. Case accepted the proposal and in due time received a check for the price of his wheel, with an expression of great satisfaction from Mr. Hopkins' representatives. The Bonita now makes 4 per cent. better time than formerly.

Another fine record was that made by the steam launch Glad Tidings, built by Charles P. Willard & Co., of Chicago, for Beall Bros., of Alton, Ill. The Glad Tidings is a 46-foot pleasure craft, and has so far succeeded in outrunning anything of her class, and several larger boats, when steaming under anything like similar conditions. Her record is 17 miles per hour. Mr. Case states that he has never yet superseded any other make of wheel but he has improved the speed of the boat.

Mr. Case called at THE RECORD office last week, after a short trip to the lakes. He has effected arrangements with the Globe Iron Works Co., of Cleveland, and S. F. Hodge & Co., of Detroit, to manufacture the wheel for large steamers, and some propellers of the Case pattern will undoubtedly be in use next season. The Bertram Engine Works, of Toronto, have secured the exclusive privilege for Canada, in the manufacture and sale of this wheel. Mr. Case expects to make a trip to Europe to arrange with shipyards on the British Isles and on the Continent, where he has his wheel fully protected by patents, as well as in this country.

NEW LIST OF MERCHANT VESSELS.

Commissioner of Navigation Eugene T. Chamberlain has done something worthy of the highest commendation in issuing his List of Merchant Vessels for 1895 during the year named. As a rule this work has been allowed to hang fire until a part of the following season had elapsed before the list could be procured by lake masters. He has also added much to the real usefulness of the work as a book of reference by eliminating the vessel descriptions and engravings, code of signals, etc. Those who have use for all these things will find former issues all right for their use, and their omission reduces the book to a much more convenient thickness, although the size of the folio remains the same.

GEN. MILES spent last week inspecting the gun plant at the Bethlehem Iron Works and Waterville Arsenal with a view to ascertaining their capacity for turning out guns in case of emergency.

MARINE LITIGATION.

FULL SPEED IN FOG.

LEATHAM & SMITH TOWING AND WRECKING CO.
VS.

THE ARTHUR ORR.

In the above case Judge Seaman, of the U. S. District Court, E. D. Wisconsin, handed down his decision about July 15, 1895. It is here given practically in full:

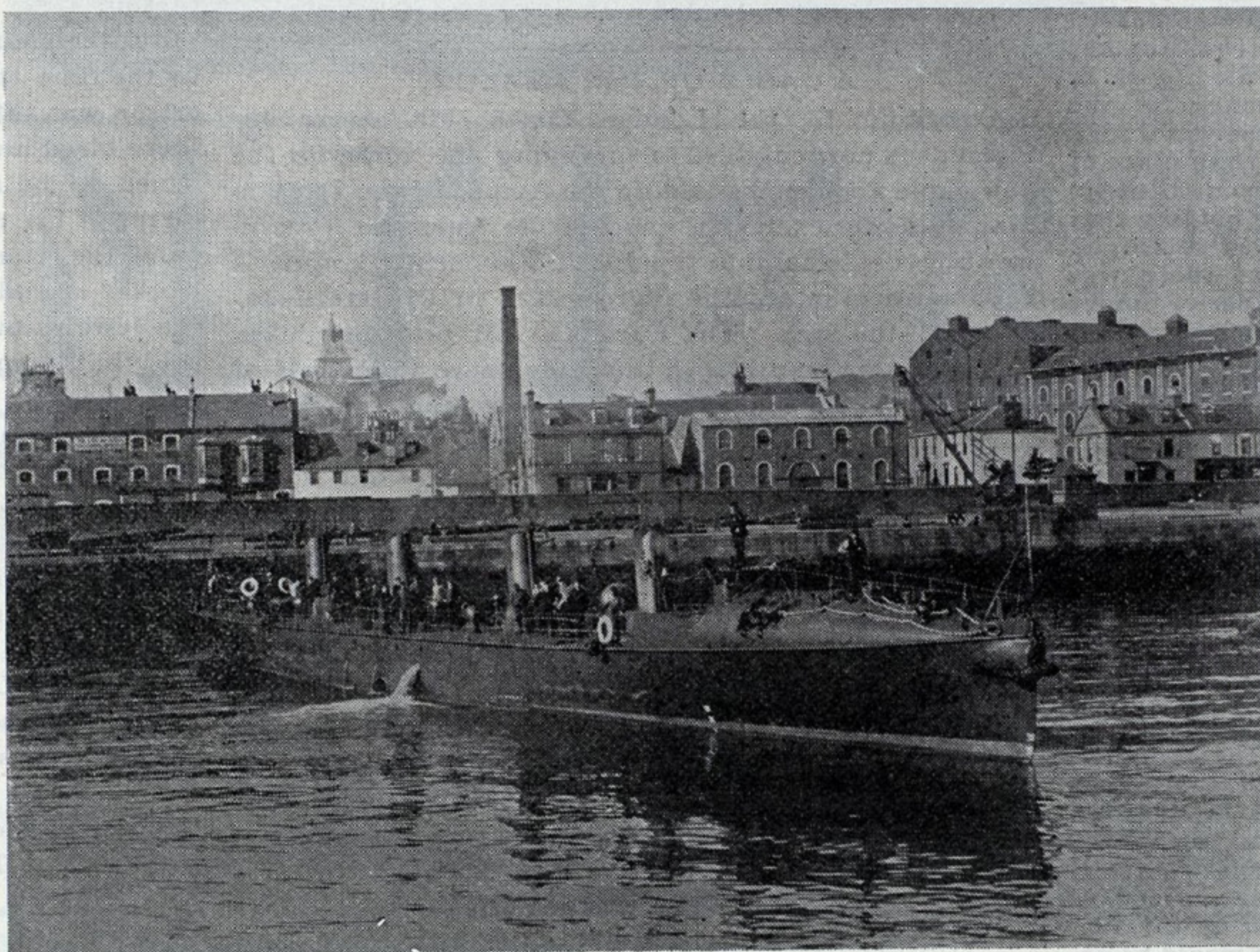
In this action the libellant, as owner of the steamer Thomas H. Smith, seeks to recover for the loss of that steamer by collision with the steamer Arthur Orr. The collision occurred in a fog off Wind Point, near Racine, on the west side of Lake Michigan, at about 3 o'clock in the morning, November 11, 1893. The Smith was sunk in fifteen fathoms of water and was a total loss. There is much of irreconcilable conflict in the testimony concerning speed, signals, lapse of time, directions of sound and distances, but the facts which are either undisputed or are well established by the evidence are sufficient, in my opinion, to show that there was negligence in the navigation of both steamers, and that the fault of both directly contributed to the disaster. The Orr left Milwaukee in a thick fog, without either cargo or charter, and for an hour immediately preceding the collision, and up to within a few moments of its occurrence, was driving through the fog on her regular course, south by east, at a speed of twelve miles per hour, according to all the reliable testimony in her behalf, this with the fog so thick that a light could not be distinguished for a distance in which the various statements place the maximum at 400 feet, and running wild directly in the path of the traffic to and from the great commercial port of Chicago. The Smith had in tow the schooner Aldrich and left Chicago at 6 p. m., light, bound for Sturgeon Bay, and were on their compass course north, but did not encounter the fog until about 2 a. m. There was no appreciable wind nor sea. Neither vessel was under sail, and they were making about ten miles an hour, both before and after entering the fog.

The three-blast whistle of the Smith, indicating a tow, was heard on the Orr three or four times before it is claimed that there was any order to check her speed, or that any signal was given other than her one-blast fog whistle. The witnesses on the Orr locate the first sound of the Smith's fog signal about one point on their starboard bow and say that it seemed to broaden there as it neared. Upon this observation they claim to have given a two-blast whistle* for passing to starboard and that the Orr's speed was then checked. The well known aberration of sound in a fog should have warned the master of the Orr that entire reliance could not be placed on it for locating the approaching steamer; and it is my opinion that even the appearance claimed was too nearly end on to venture the signal thereupon for passing starboard to starboard. The testimony on behalf of the Orr is positive that her course was not changed, but that she kept on with the same helm, and under some check, waiting for an answering signal; and I do not think there is sufficient in the circumstances on which it is alleged on the part of the libellant that she came up on the starboard helm to overcome this direct testimony. She should, therefore, be acquitted of that fault.

Whether it was a negligence for this steamer to leave port in the dense fog which then covered her course, and in the absence of any imperative necessity, is an important question, and is strongly pressed for consideration in favor of the libellant. There are English cases that seem to so hold, and in *The Orange*, 46 Fed. 408, Judge Brown remarks: "Unnecessary navigation in such a fog was in itself imprudent and unjustifiable." Again, in *The Battler*, 62 Fed. 612, the question was urged before Judge Brown in reference to a tug starting with her tow, out of the Kennebec River for New York, during the temporary lighting up of a prevailing fog which shut down on them, however, before reaching the open waters; and upon the testimony of navigators it was held that "the start was one that would be considered reasonably prudent by skillful and prudent pilots accustomed to navigate these waters." No Amer-

ican authority is cited which would sanction a ruling that it was negligence per se in a steamer to leave port or to proceed in a fog, and that liability for injury could be predicated on that fact alone without other showing of fault. But there is no requirement to determine this question in the abstract, because it is well settled that in proceeding under such circumstances the steamer "was bound to observe unusual caution, and to maintain only such rate of speed as would enable her to come to a standstill, by reversing her engines at full speed, before she could collide with the vessel which she could see through the fog," (*The Nacoochee*, 137 U. S. 330, 11 Sup. Ct. 122; *The Colorado*, 91 U. S. 692), and this interpretation of the navigation rules is sufficient to place gross fault upon the Orr in the instant case. Whatever right she had to proceed in a fog was subject to the condition that she could and would run at a rate under which she could be controlled against the infliction of injury to the numerous craft she was liable to meet or overtake in the great thoroughfare through which her course was laid. Her fault was in the speed maintained, and any checking down which was attempted after the warning of the approach of a steamer encumbered with a tow was manifestly insufficient for the necessary control to avoid collision under the known conditions. The warning was in ample time, and if her speed had been modified as Rule 21* intends, she could have been stopped when the tow was sighted; or if her power or bulk made the control uncertain, she should have stopped before reaching the immediate vicinity, to await an exchange of signals for passing.

On the part of the Smith there was also gross fault. She kept up her speed of ten miles an hour after entering the fog, and up to within a few moments of the meeting. She was not even checked down until after



BRITISH TORPEDO-BOAT DESTROYER, IN ALBERT HARBOR, GREENOCK, SCOTLAND.

her wheel was ported. The combined speed of the steamers was such that there was not sufficient opportunity to ascertain their relative positions or to exchange signals intelligently and seasonably. From the libellant's testimony it appears that the fog signal of the Orr was not heard on the Smith as early as those on the Orr claim to have heard that of the Smith, and that they did not hear the first two-blast passing signal claimed to have been given by the Orr. The mate was on watch and he says he heard the fog whistle, which he located on his port bow, and immediately put the wheel apart, and blew the one-blast whistle accordingly. The captain then rushed on deck and ordered the speed checked, which was too late for safety. They heard the supposed cross signal from the Orr after these orders. Almost immediately she loomed in sight, under considerable headway, and struck the port side of the Smith about amidship, the blow angling slightly "from aft forward." The vice in this manoeuvre of the Smith was the hasty porting of the helm. Instead of checking down or stopping until the position of the Orr could be known, they acted prematurely. This radical change of position was apparently made upon the reliance upon location of the sound in a fog and when even that semblance was barely on his port bow. They should have signaled and waited for an answer on which to act intelligently. She thus ran directly across the bows of the Orr and brought on a collision. It is not claimed of the manoeuvre that it occurred in extremis. It was deliberate, and cannot be entitled to that excuse. The speed of both steamers undoubtedly produced confusion and prevented intelligent action. There was mutual contributory negligence, and the damages must be equally divided.

NEW BRITISH TORPEDO BOAT DESTROYERS.

(ILLUSTRATED.)

At the beginning of the present financial year Earl Spencer, then First Lord of the Admiralty, stated that during the year tenders would be invited and orders placed for the construction of 20 torpedo-boat destroyers, in addition to the 42 already provided for. Although a large number of noted shipbuilders have been invited to tender for the construction of the new vessels, orders have so far been given for the building of only 12, and this number is equally divided between three firms, Thornycroft & Co., Chiswick; Laird Bros., Birkenhead, and J. & G. Thomson, Glasgow. These vessels, which are guaranteed to attain a mean speed of 30 knots during a three hours' continuous full-power trial, will be no larger than the 27-knot destroyers. Several of the latter have a displacement of 300 tons, whereas of the 12 new destroyers, the four built at Chiswick, the *Desperate*, *Fame*, *Foam* and *Mallard*, will each be of 272 tons displacement, and the remainder of 300 tons. Although this displacement tonnage is similar, there is a very great difference between the indicated horse-power proposed for the new vessels and that attained by the existing destroyers. The average horse-power of the latter is about 4,000, but Thornycroft & Co. have guaranteed an indicated horse-power of 5,400 in each of their new vessels; Laird Bros. guarantee 6,000, and Messrs. Thomson guarantee 5,800 indicated horse-power. The arma-

ment of the 30-knot boat will consist of one 12-pounder and five 6-pounder quick-firing guns, four 18-inch Whitehead torpedoes, and two single revolving torpedo tubes.

The illustration shows one of the torpedo destroyers built by the British government. The photo was taken just as she was leaving Albert Harbor, Greenock, on her trial trip on the Clyde, on which trip she made a record of 29 knots, or 33½ statute miles, per hour. The photograph is one of a very fine series taken by Mr. Frank Wood, of Greenock, Scotland, a brother of Mr. W. J. Wood, naval architect, who is at present with the Goodrich Transportation Co. The later torpedo-boat destroyers are built with higher stacks. The *Starfish*, built at Barrow-in-Furness, ran her official speed and steering trials on October 7, and made an average speed of 28 knots an hour, or one knot more than her guarantee. The amount of coal consumed on the three-hours' run was 15 1-10 tons, a creditably small consumption on forced draft with water-tube boilers.

Mr. Walter Miller, in a letter on another page, has also something very interesting to say about these torpedo catchers.

LITERARY NOTICES.

The Christmas Harper's introduces an innovation in magazine pictures—successful color-printing. The frontispiece, from a painting by Howard Pyle, is the first departure from magazine illustration in black and white which can truthfully be said to be more artistic than the simpler medium. The short stories include a picture of fashionable New York life, by Brander Matthews, called "An interview with Miss Marleenspuyk," in which the newspaper woman is introduced.

The *Lorain Herald* has just published a very attractive industrial edition, which is profusely illustrated with fine half-tone views of the city docks and harbor, the Johnson steel plant, public buildings, residences, business blocks, and portraits of prominent citizens. The issue also contains much excellent descriptive and historical matter, and is enclosed in a handsome colored cover. It is in pamphlet form, about the size of *THE RECORD*. The publishers have shown excellent judgment in this respect, as in all other directions in connection with the edition, as it is thus rendered easier to file and retain for reference.

THE Jackson & Sharp Co., of Wilmington, Del., have contracted to build a fishing steamer 85 feet long, 20 feet beam and 7 feet deep, for pleasure service at Anglesea, N. J.

*It must be noted that the vessels were then sailing under the pilot rules and regulations in force in 1893.

NEWS AROUND THE LAKES.

CLEVELAND.

Mr. James H. Dalliba, for many years in charge of the ore sales department of Pickands, Mather & Co., has been elected to the position of assistant to the president of the Lackawanna Iron & Steel Co. He assumes his new duties December 1.

The Smith Transit Co., consisting of W. A. and Arthur W. Hawgood, W. S. Manuel, and other owners of the recently purchased Iosco, have incorporated the Smith Transit Co., with capital stock at 80,000, with principal offices at Rockport.

The Otis steel plant is about to be constructed upon the authority and orders of the English stockholders. The details of the contemplated improvements have not yet been given out. It is the intention to modernize the departments in which the works have been most successful in the past, and while such has been reported, it is hardly the intention of the company to build blast furnaces and docks, although the value and economy of such an addition is clearly apparent to the directors.

The American Shipbuilder published last week a fine portrait and extended sketch of Mr. Walfrid T. Sylven, who has a large acquaintance here, formed while he was superintendent of construction on the light-house tenders Lilac and Columbine, built at the Globe shipyard a few years since.

DULUTH AND SUPERIOR.

Special Correspondence to The Marine Record.

The seizure case of the tug Lindrup came into court again with rather unexpected results this week. In July 1894, it will be remembered, the U. S. marshal chased the Lindrup nearly to the Sault, finally overhauling her and bringing her back to Duluth on a libel filed by B. B. Inman. Not long after the seizure the proctors for the owner, John Sorenson, moved a dismissal before Judge Williams, of Arkansas, who was sitting here in place of Judge Nelson. The motion, made on the grounds of no proof of jurisdiction, was denied, the judge holding that as the marshal's return showed that she was seized on the open waters of Lake Superior, and that there was jurisdiction over open waters of Lake Superior under the act providing for the admission of Minnesota into the Union. Judge Nelson has now ruled that the locality where the vessel was seized must determine the jurisdiction, and while he says that Judge Williams did not decide that the marshal had jurisdiction, but only that the state's jurisdiction extended over the open waters, he has virtually reversed it in effect. The marshal's return stated that the vessel was seized "in the open waters of Lake Superior, about 3,000 feet from the pier at Sault Ste. Marie, Mich." Judge Nelson's decision says: "The St. Mary's river forms the common boundary line between the State of Michigan and the Dominion of Canada, so that a point 3,000 feet from the pier where the vessel was seized, in fact, may be within the territorial limits of Michigan or Canada. The supposed difficulty in the case has arisen from the fact that the marshal, not satisfied with making a return that he had attached the tug in obedience to the monition, states in addition that the place where he made the seizure was within the open waters of Lake Superior, which statement was a conclusion which the marshal was not authorized to find, and prevent the claimant from contesting the fact thus appearing in the return. Manifestly it would be unjust to hold that a return not necessary to be made in respect to the place of seizure could give the court jurisdiction of the rest, and leave the claimant without remedy, except by suit against the marshal. The court decides the question of jurisdiction, and not the marshal; the duty of the latter is to obey the monition, and he has no power to preclude the examination of a judicial question by an unauthorized statement in his return.

"The libel must be dismissed for want of jurisdiction. No decree can be made as to the costs. Each party is responsible to the officers of the court for the costs incurred at his instance."

The Mahoning dock shipped its last cargo of ore last week. The bay is freezing rapidly, and considerable tug service has already been necessary to keep navigation open.

From all that can be gathered, the Northern Coal Storage Company, which has control of all the soft coal at the head of the lakes, is a huge success, although it has been in existence only since last spring. One of its objects is to save delay in the discharging of cargoes from vessels. Suppose that four vessels happen to arrive at the same time, all of which are consigned to a certain dock that is able to handle only two vessels at a time. Instead of letting two of the vessels wait for two days, the Northern Coal Storage Company distributes them among the various docks to best advantage, for the coal nominally belongs to the Storage Company, in which each of the consignees have stock proportioned in a satisfactory manner. This scheme has worked well in the disposition of boats this summer. In speaking of the Storage Company a well-known authority says: "I think it is a matter of only a short time before all the docks at the head of the lake will be consolidated in one big company. It may take two years, and it may take more, but the tendency as shown by the success of the Northern Coal Storage Company in the handling of soft coal is toward one management. At present each of

these companies has its own force of blacksmiths, its own machine shop, a separate office force, and a separate set of salesmen. The salesmen of one company are continually running across those of the others all over the West. With a single company expenses in all these departments could be minimized. Labor could be employed to better advantage with a single company, and the disposition of the coal on new docks could be better made. Certain docks could be used for local hard coal, certain others for local soft coal, and certain others for the various stocks of railroad coal. Switching charges could be cut down considerably. There is one dock at which 2,000,000 tons a year could be handled, and every road at the head of the lake has access to it free of switching charges."

BUFFALO.

Special Correspondence to The Marine Record.

Chief Engineer Thompson Pike, of the steamer Arthur Orr, died of pneumonia in Duluth Tuesday of last week at the age of 58 years. Mr. Pike had been a resident of Buffalo a great many years. For 35 years he had been engaged in engineering on the lakes, and for 25 years of this time he was connected with the old Union Steamboat Line. He was well known in Buffalo and of course to all lake-faring men and those connected with marine interests, and he was highly esteemed everywhere. The deceased leaves a wife, a daughter and a son living at No. 139 Potomac Avenue.

Harbor Master Soper deserves great credit for the efficient work he did while the elevator blockade was on. He kept the channels in the creek and Blackwell canal open, so that vessels had very little trouble in getting in and out.

One or two elevators are still in bad shape, but generally the situation has greatly improved, and incoming vessels are being unloaded with more dispatch.

A CABLE UP THE AMAZON.

According to the London Times, Mr. Alexander Siemens is now engaged in surveying the route for the new cable about to be laid up the Amazon from Para to Manaos under exclusive concessions from the government of the Brazilian republic. The entire length is 1,365 nautical miles, and there will be in all sixteen stations on the line. The Faraday will probably leave England next month with the cable, more than half of which is already manufactured. This long sub-fluvial line will for the first time bring these regions, so increasingly productive of india rubber, coffee and sugar, into direct telegraphic communication with Europe. All past attempts on the part of the Brazilian government to establish aerial lines through these districts have failed, owing to the rapidity and density of the forest growths. Mr. Reidy, representative of the Amazon Telegraph Co., joined the expedition at Para. The great importance of the Amazon as a trade route may be gathered from the fact that the Farady, a steamer of 5,000 tons burden, will proceed all the way up to Manaos, a distance of 1,100 miles from the mouth of the river.

A SLIGHT OMISSION.

An error, or rather an ambiguity occurred in our sketch of Col. Jared A. Smith last week. The injuries he received after the battle of Cedar Mountain occurred in this way. He was outside the lines, about 11 o'clock at night, on staff duty, with Generals Pope and Banks, who were discussing the situation and reconnoitering, when the party, who had dismounted, were surprised by a squadron of Confederate calvary. Generals and staff officers retreated pell mell. The Union troops heard them approach, and thinking it was a charge of the Confederates, opened fire. This was still further demoralizing, and the party scattered right and left, Colonel Smith being injured in the confusion which followed.

POPULAR PORTAGE LAKE CANAL.

The forthcoming annual report of Major G. A. Marr, superintendent of the Portage Lake ship canal, will show that the tonnage passing through the canal this year was practically double the tonnage of 1894, which was much the largest on record. The principal gain will be in wheat and iron ore from the head of the lakes. No cargoes of grain or ore have ever passed through the Portage Lake channel previous to this season, but masters are by no means slow to take advantage of the deep water in the improved canal to avoid the dangerous navigation around Keweenaw Point.

It has been indefinitely decided not to order a court of inquiry to investigate the injuries sustained by the Texas. This will be left to the Board of Inspection and Survey, which will inspect the vessel in December.

A PRODIGY OF THE LAKES.

On another page appears the advertisement of a nautical watch chain and charm of particularly fine workmanship, make and sold by Morgan A. Robertson, of No. 26 John street, New York. Mr. Morgan is a product of the Great Lakes region, and has a rather interesting history. He is a son of Capt. Andrew Robertson, of Oswego, N. Y., an old-time lake skipper, and followed in his father's footsteps by going to sea. At the age of 16 years he shipped on board the Boston ship Ringleader, bound for Shanghai. He circled the globe in this ship, left her at Liverpool, and shipped for New York in the St. Mark. He then sailed the lakes for a season, and for the next seven or eight years varied his time between fresh and salt water sailing. Although, frequently filling mates' and second mates' berths, he was too much of a free lance and too little of a diplomat to secure command of a craft, and this, with the advice of a prominent Chicago phrenologist, induced him to change his business. The professor's advice was that possessing a splendid endowment of mechanical skill and constructive ability, he could advance rapidly to the front in any trade or mechanical profession he should choose, from shoeing horses to building bridges and viaducts. Acting on this new resolve he made a few more trials to secure ready money and then offered himself to an old watchmaker as apprentice. The latter took him, more with the idea of getting a good deal of amusement out of his sailor pupil than for any other reason.

But the young man advanced wonderfully well, and by the time the tarred fingers were limbered, Mr. Robertson was sufficiently advanced to go to New York. He there hired himself as a workman wherever there happened to be a vacancy, and holding the position by virtue of his mechanical ingenuity, and in three years from the time he dropped the marlin spike he had worked at and mastered the technique of every trade in the jewelry business, except engraving, and neglected this that he might go higher. Diamond setting, his last and proudest achievement, is not only a better paid trade than engraving, but includes many of the tools and methods of the engraver's art in its scope.

Mr. Robertson is also something of an author. About a year and a half ago he contributed an article to the American Shipbuilder, New York, on "The Sparring and Rigging of Three-Masted Schooners," which was a criticism of the Atlantic Coast rig compared with that of the Great Lakes, which attracted considerable attention. Later he contributed an article to the daily and weekly press with such success that he has ventured to try his hand at a book. It is a satire in verse upon some so-called "orthodox" doctrines in religion. Its title is "The Tale of a Halo," and it is well illustrated. The story is of a surreptitious visit of Beelzebub to Paradise, the turmoil he raised, and his final eviction by St. Patrick. It is humorous and grotesque throughout, and interspersed with nautical expressions, that, considering the saintly, angelic or demoniac speakers involved are laughably apt and pertinent.

A SURE WARNING.

Mr. Horace See, of No. 1 Broadway, N. Y., is introducing what is known as the Russell-See Electrical Indicator. The object of this invention is to supply a system perfectly reliable under all conditions. It is applicable to the running lights on shipboard, to railway signals, burglar alarms, hotel indicators, theatrical work, etc.

One new and special feature, and one which it alone possesses, is that the whole system, wherever incorporated, is operated by one current without any interruption taking place in change of circuit, thus offering a perfectly reliable, as well as durable device, performing its work without any break in the circuit. It consists of a simple indicating and controlling mechanism.

When applied to a vessel, the pilot will at all times be informed of the condition of his running lights, both by visible and audible indications produced in the pilot house or other convenient place, so that when a lamp happens to go out, another one is immediately set in glow in place of it and an alarm is set up which continues until the first lamp is restored.

The vessel equipped with this device will have, in case of a night collision, strong evidence to corroborate that of her officers that the lights were burning.

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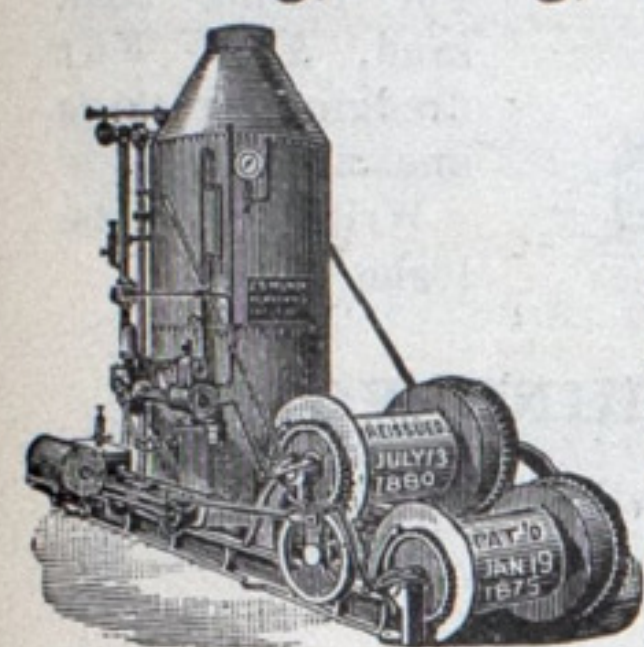
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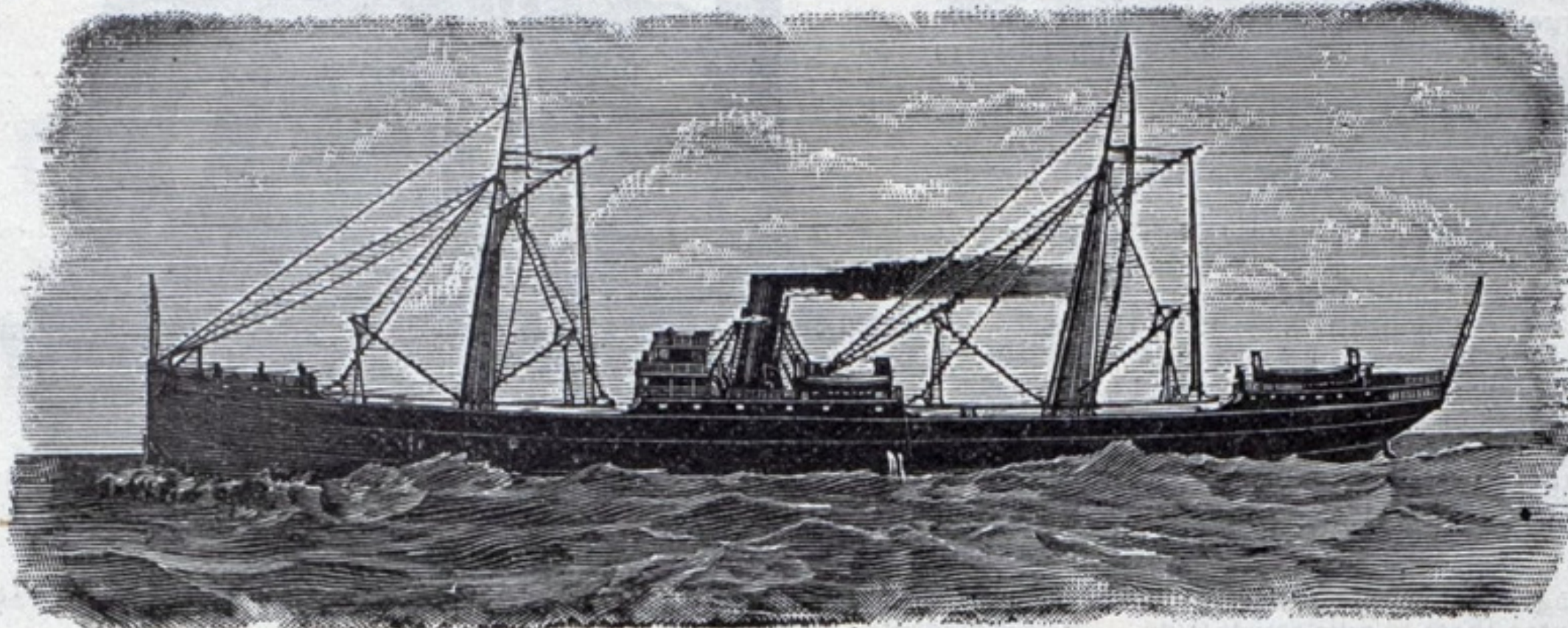
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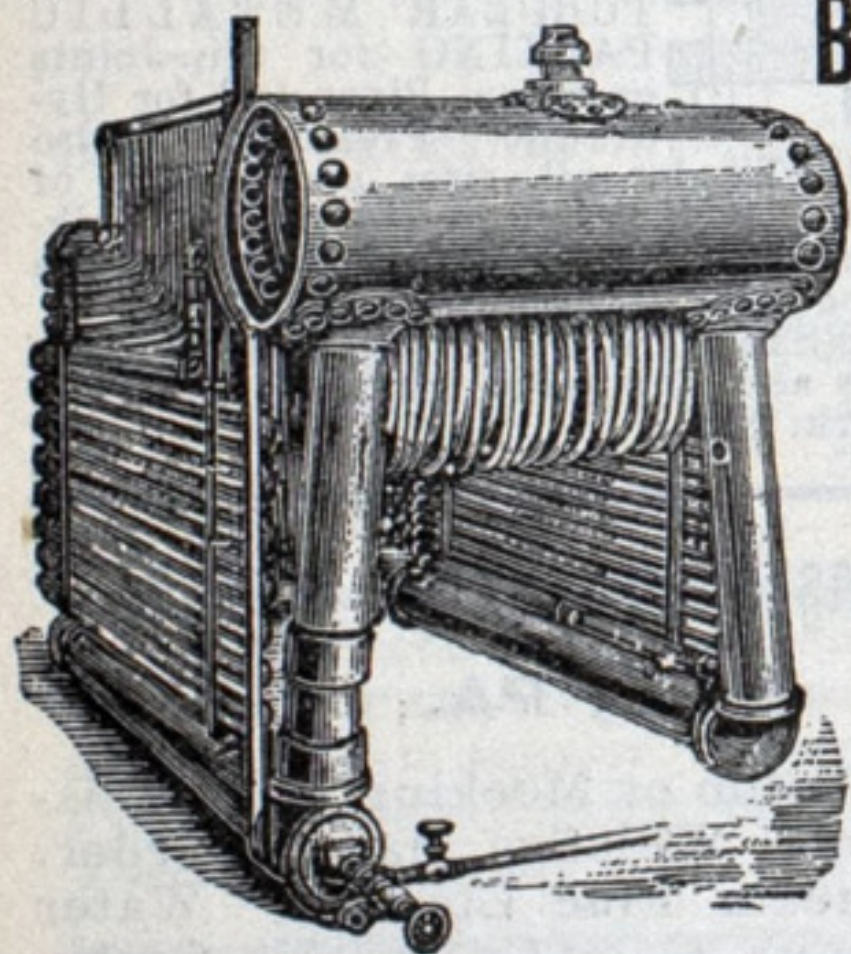
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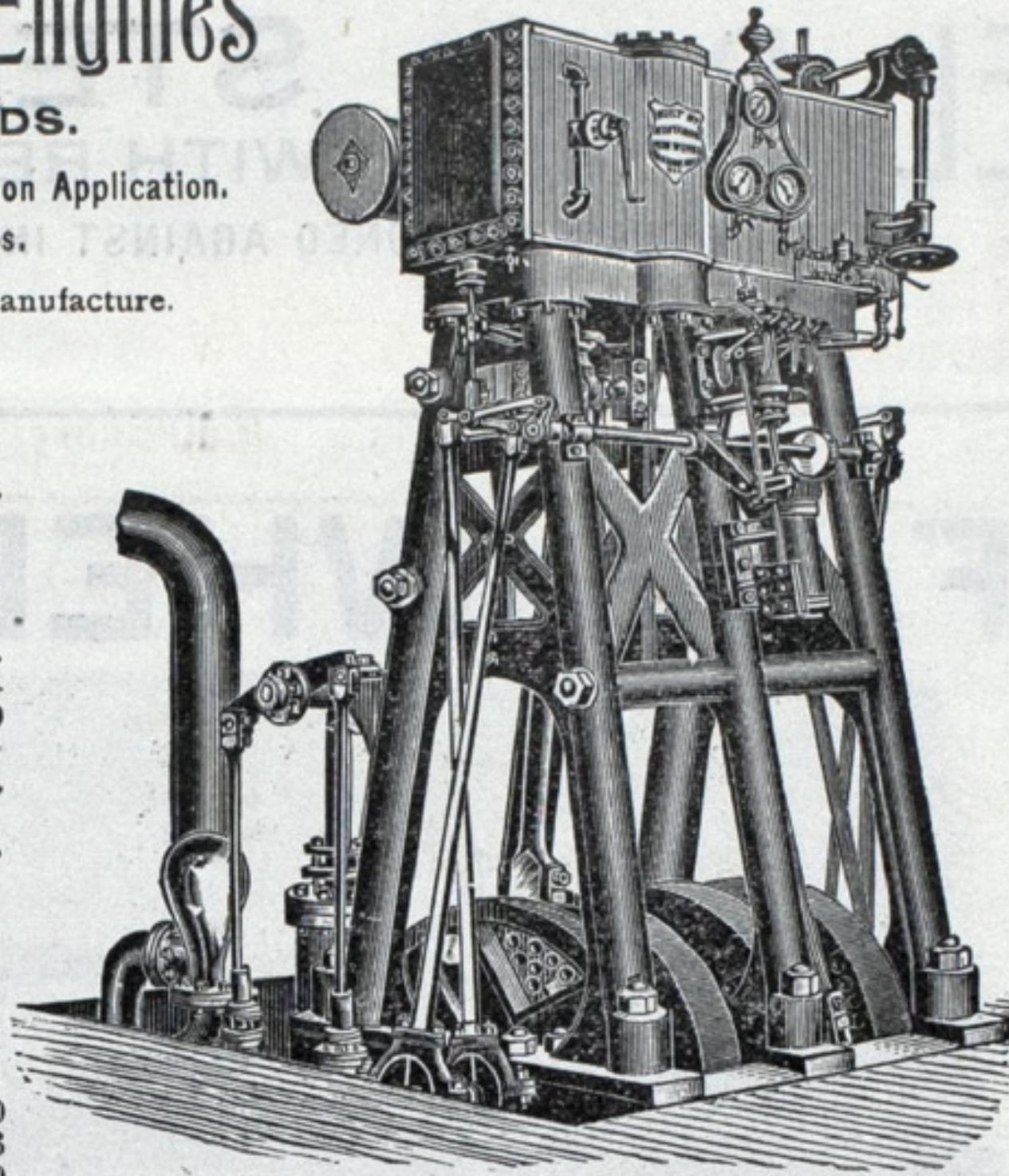
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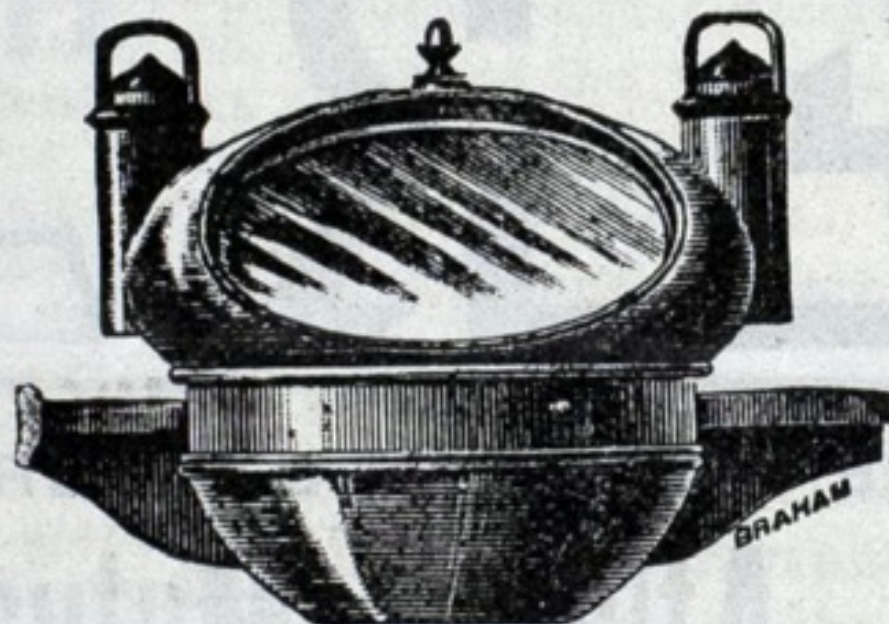
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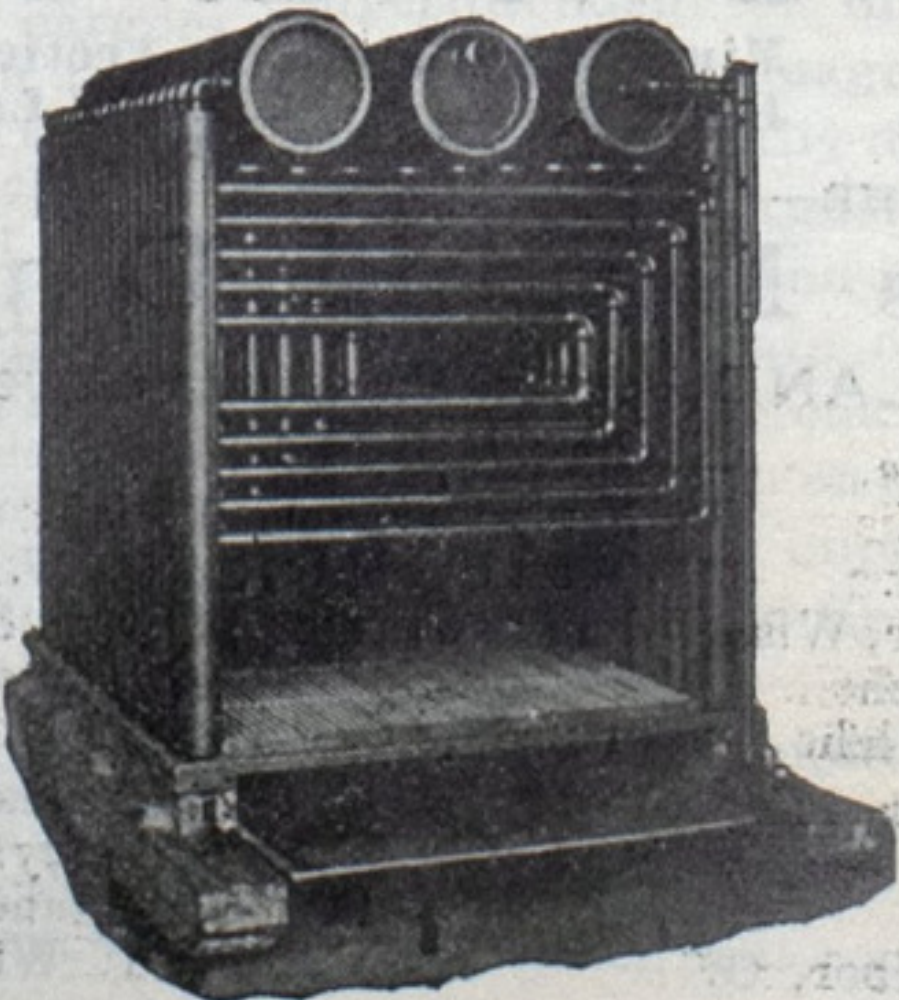
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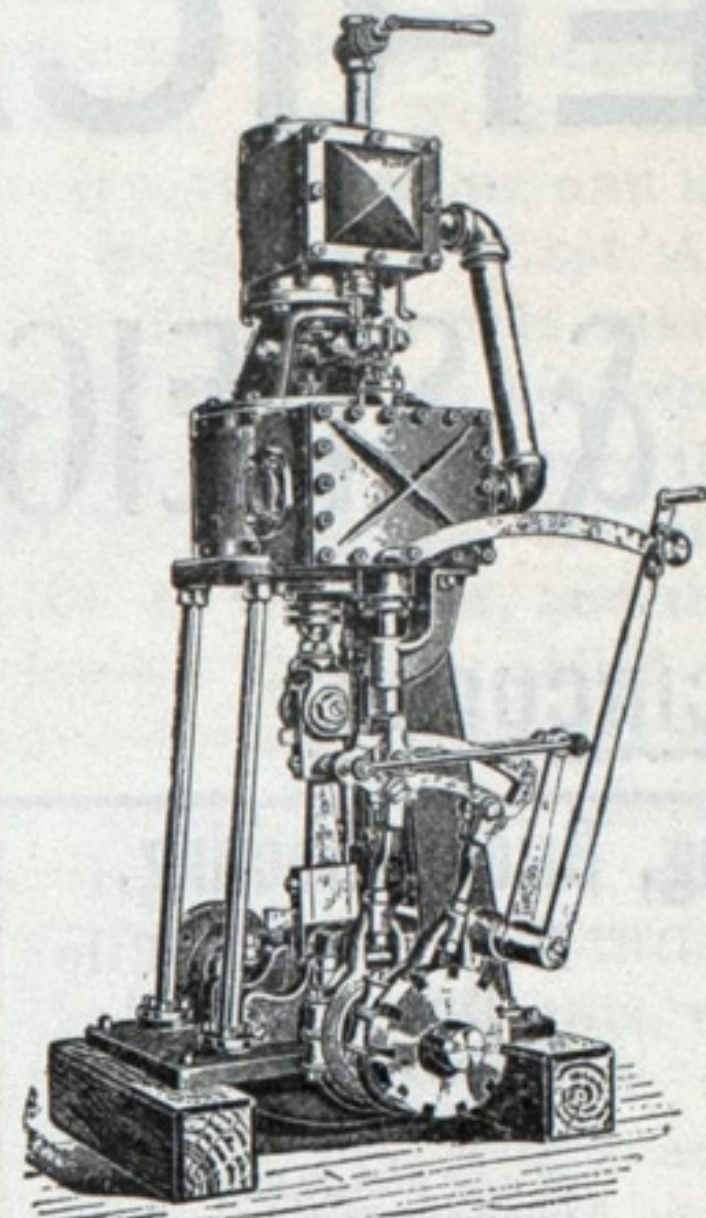
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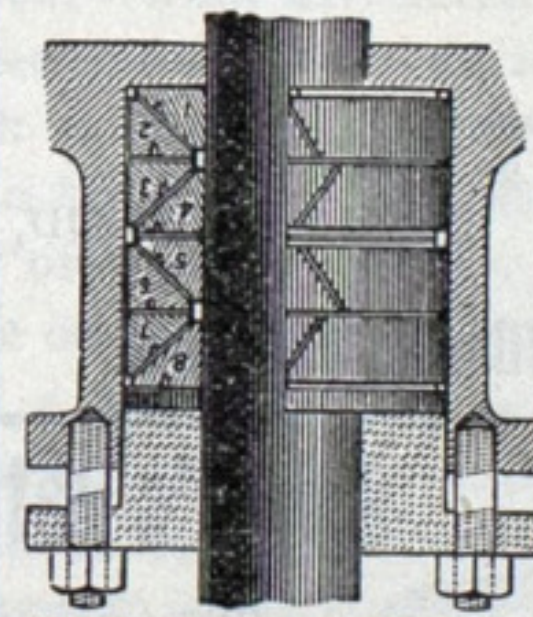
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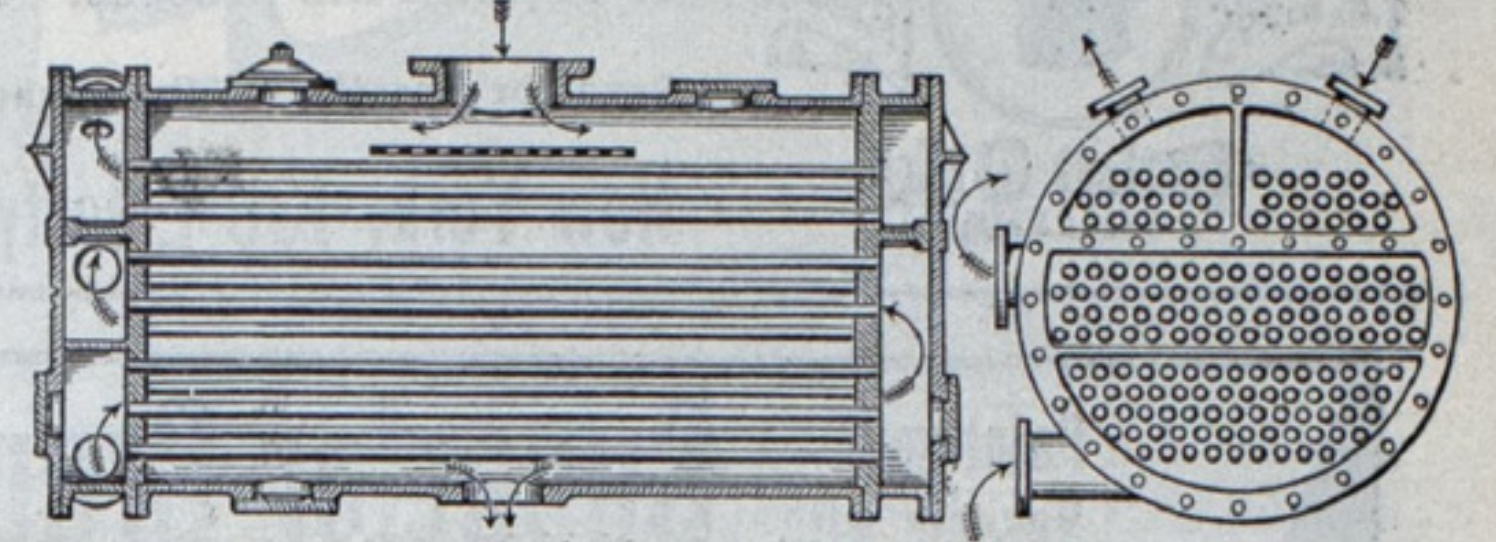
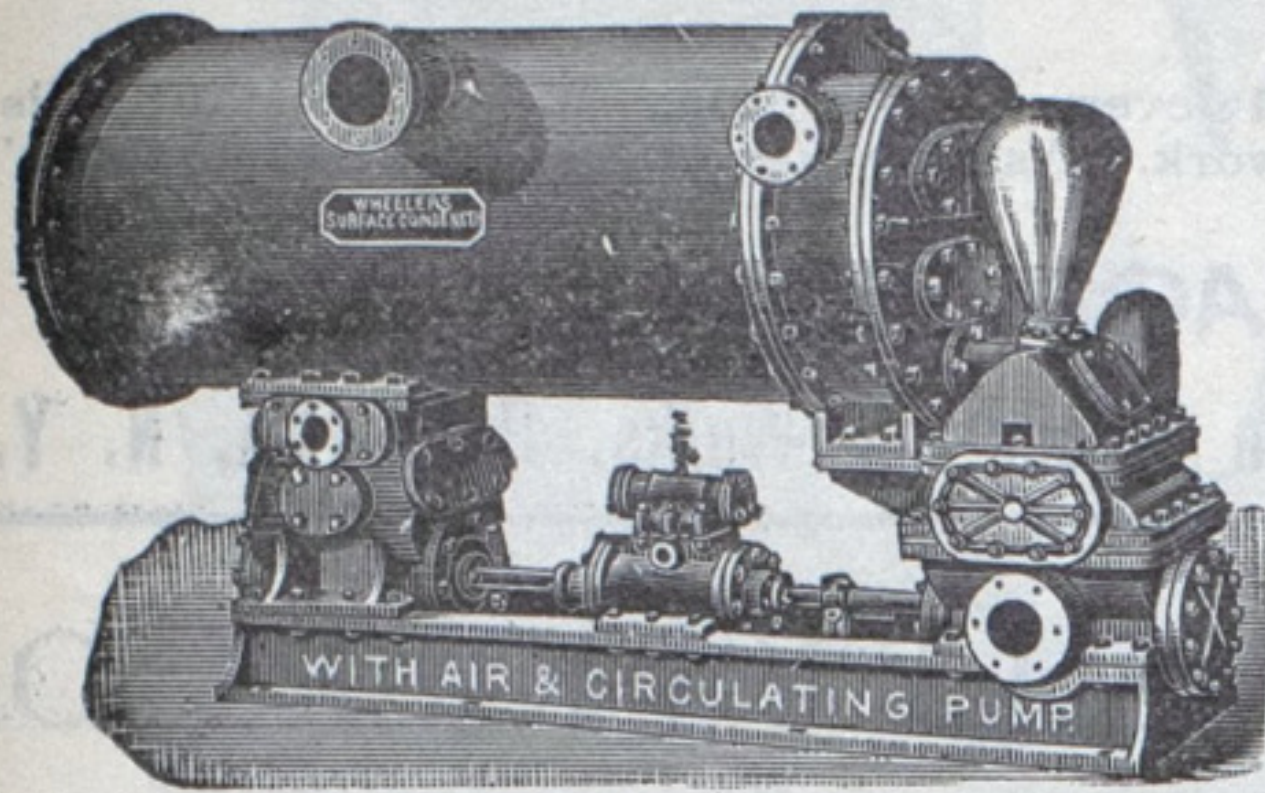
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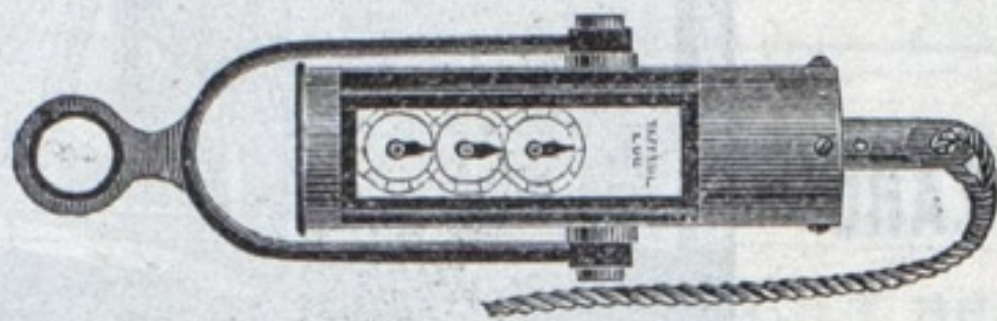
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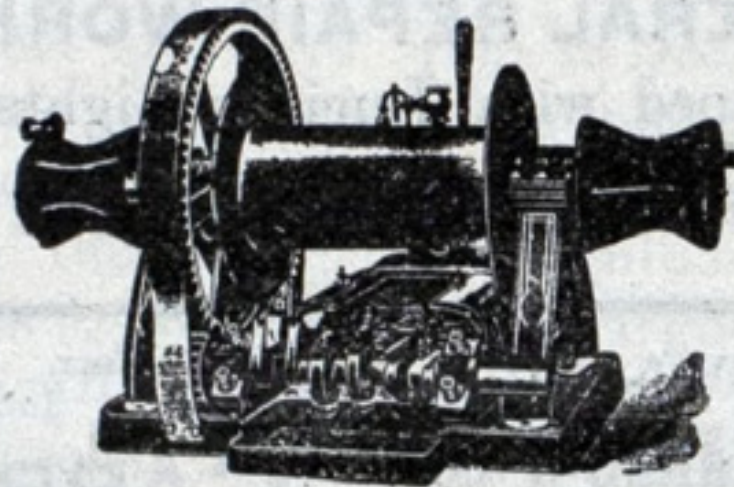
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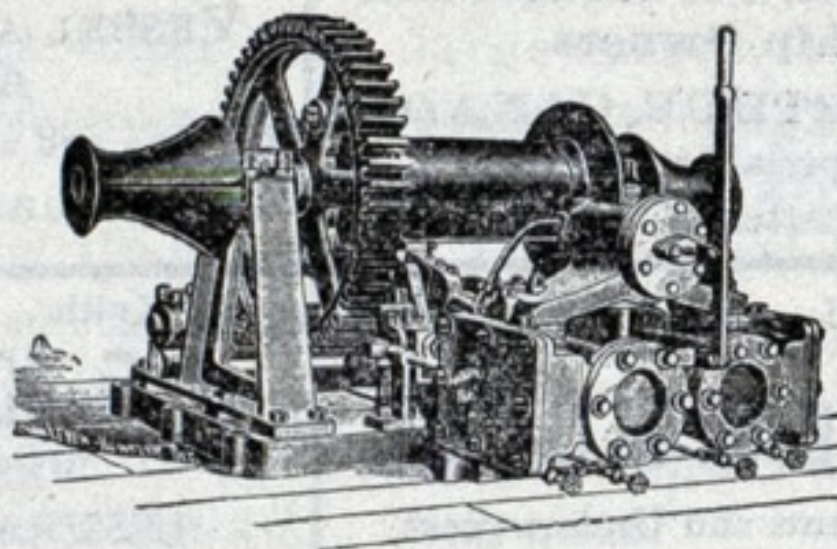
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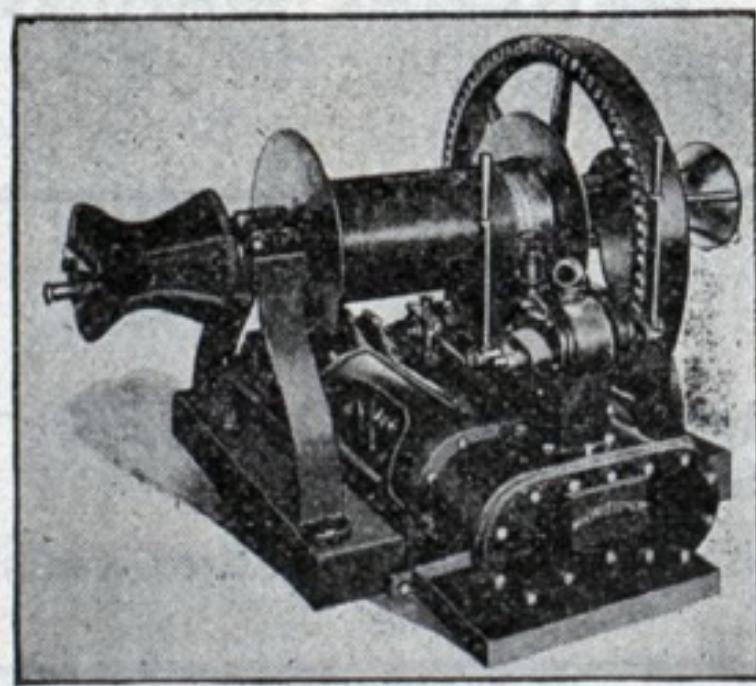


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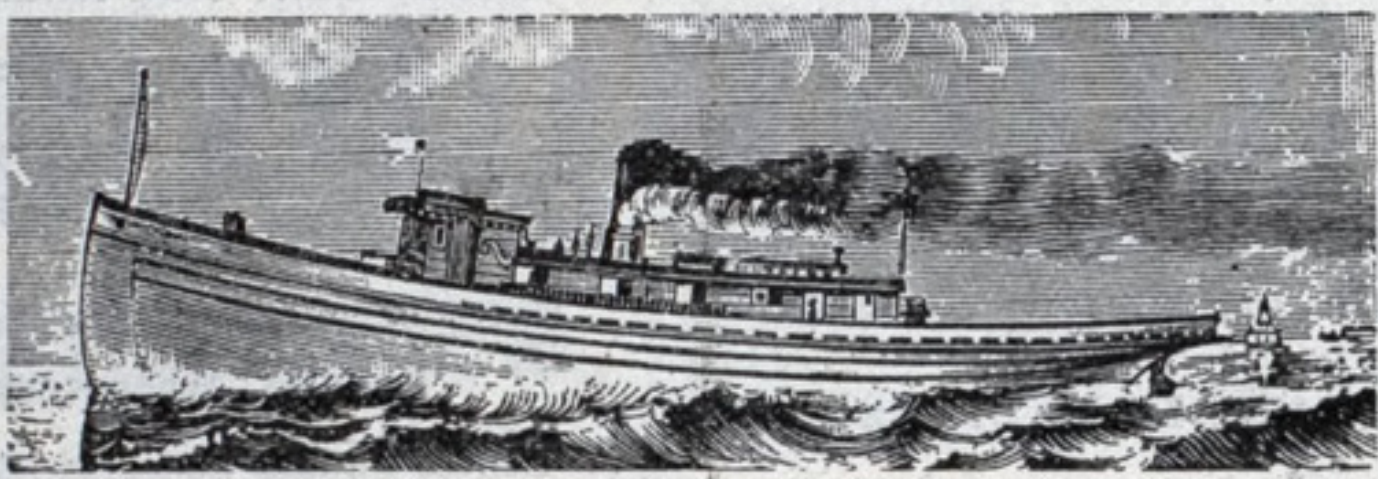
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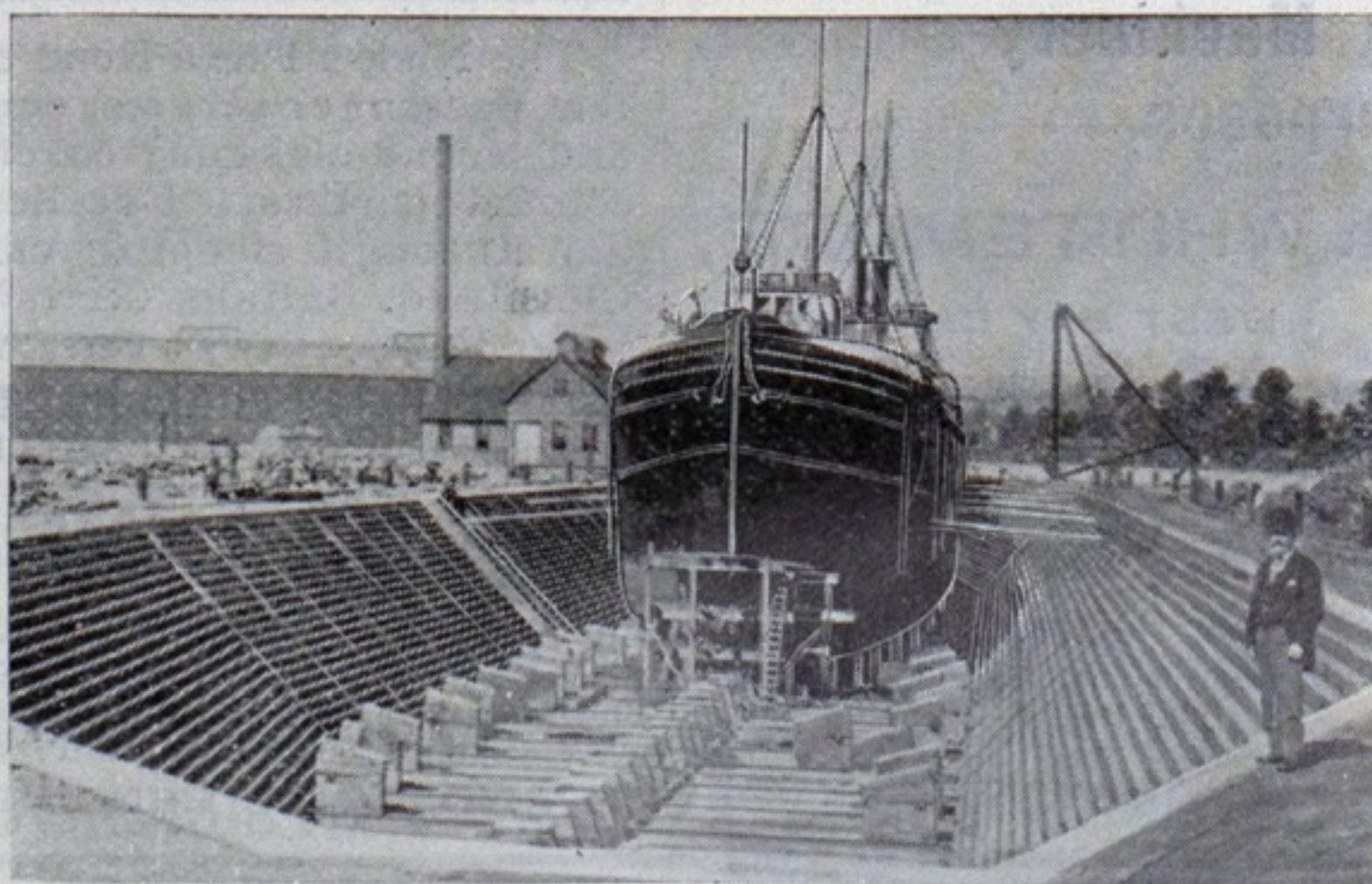
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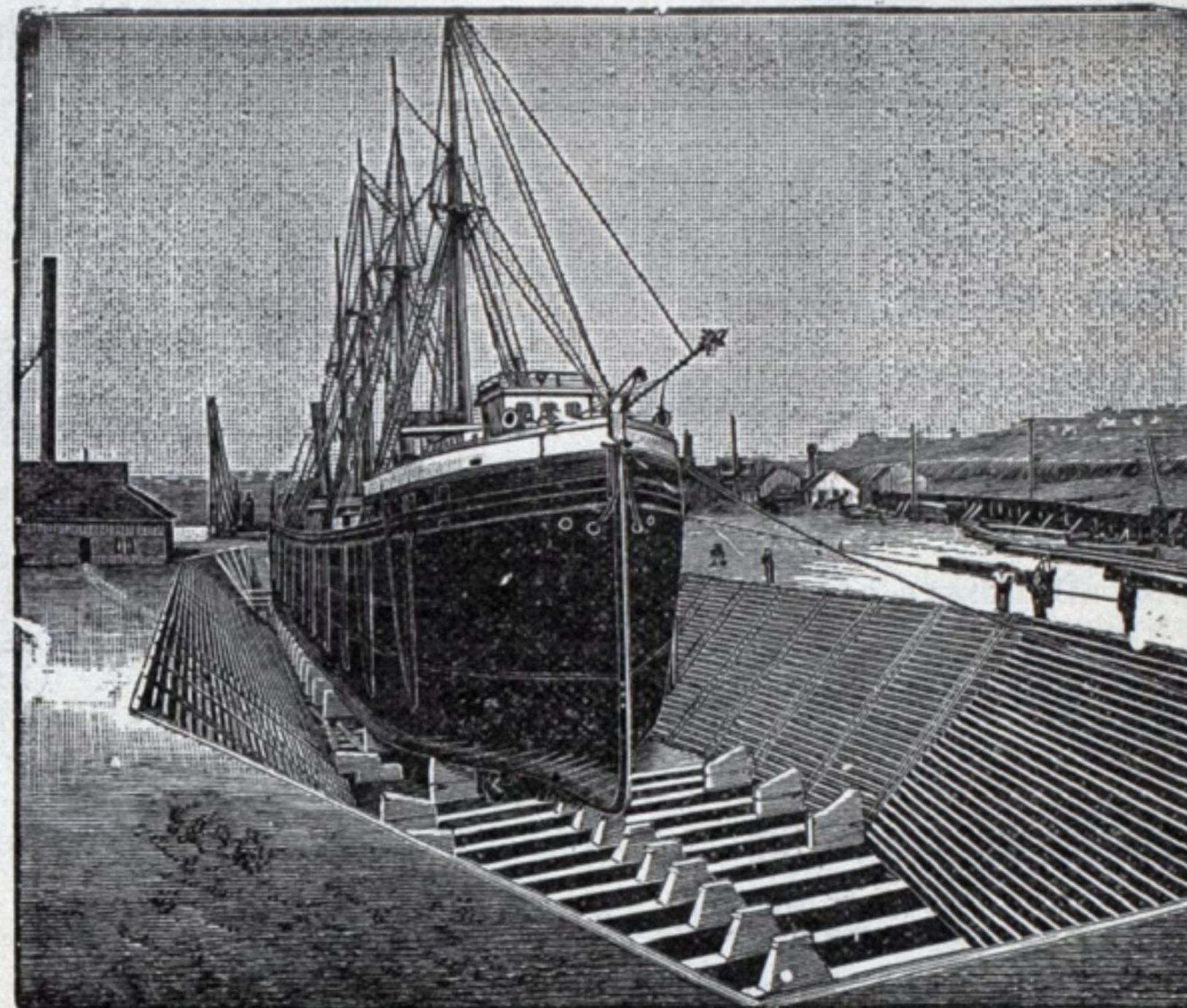
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